This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

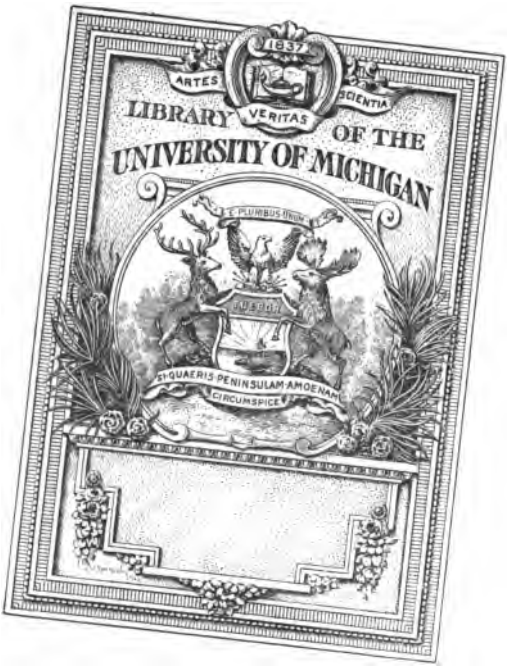
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`


1837
ARTES
SCIENTIA
VERITAS
LIBRARY
OF THE
UNIVERSITY OF MICHIGAN
E PLURIBUS UNUM
SI QUAERIS PENINSULAM AMOENAM
CIRCUMSPICE

HC
107
.A12
A3

Compliments of

S. W. Matthews,

Com. of Bureau of Statistics.

Smith & Reid,
BOOKBINDERS,
AUGUSTA, ME.

SI QUAERIS PENINSULAM AMOENAM
CIRCUMSPICE

HC
107
.A12
A3

Smith & Reid,
BOOKBINDERS,
AUGUSTA, ME.

THIRTEENTH ANNUAL REPORT

OF THE

BUREAU

OF

Industrial and Labor Statistics

FOR THE

STATE OF MAINE.

1899.

AUGUSTA
KENNEBEC JOURNAL PRINT
1900

STATE OF MAINE.

OFFICE OF COMMISSIONER OF
INDUSTRIAL AND LABOR STATISTICS,
AUGUSTA, December 31, 1899.

To His Excellency, Llewellyn Powers, Governor of Maine:

SIR: I have the honor to present the report of the Bureau of Industrial and Labor Statistics for 1899.

Very respectfully,

SAMUEL W. MATTHEWS,

Commissioner.

160688

INTRODUCTION.

The attention of the Bureau during the past year has been largely devoted to those important branches of Maine industries, the lumber, and the pulp and paper.

Under the head of the "Lumber Industry" an article is published in this report, which, it is believed, will be found both interesting and instructive. The vast extent of this industry, covering the larger part of our territory, renders it impossible, with the limited means at its command, for the Bureau to obtain full and complete statistics, yet the facts and figures obtained are sufficient to show the great importance of this branch of industry in the industrial life of our people. The investigations of the magnitude and conditions of the pulp and paper industries, cover the ground very completely, and may be considered as exhibiting the entire business in its present aspects. These industries have had a phenomenal growth and development, having, within a few years, from small proportions and minor importance, attained a leading rank and standing among our diversified industries. The various questions of material supply and possible limitations have been considered, and the conclusions arrived at are herein published. It is believed that this investigation will prove of great public interest and benefit, as well beyond as within the limits of the State.

Other features of the report, are statistics of manufactures of cotton, wool, boots and shoes, with brief articles on lime and slate, and descriptions of several special business enterprises, such as the manufacture of plush and worsted, at Sanford, and the manufacture of agricultural implements at Auburn.

The tabulation of returns of officers of towns and cities, of factories, mills and shops built, enlarged or in process of erection during the present year, shows a gratifying increase in numbers and of money invested, indicating a marked improvement in business conditions and prospects.

An interesting compilation of facts and figures with regard to the steam and electric railway systems of the State is included in the report.

The conditions of labor have been very satisfactory during the past year. Our working people have experienced no lack of employment at fair wages. Labor disturbances have been few in numbers and brief in duration.

The commissioner desires to express his appreciation of the faithful and conscientious services rendered him in the prosecution of his work by his able clerk, Major C. J. House, and special agents, Francis Wiggin, R. L. Fernald and Louis J. Brann.

THE COTTON INDUSTRY.

Complete returns from ten cotton mills were received at this office in 1897, and the same number in 1898. The same were tabulated and certain deductions drawn from the totals and averages shown. The present year, twelve such returns have been received, ten of which are identical with those received last year. The following is the tabulation of the twelve returns received for the fiscal year ending June 30, 1899.

COTTON GOODS.

	Capital invested.	Cost of material used.	Value of product.	Number weeks in operation.	Average Number Hands Employed.				Average Weekly Wages.			Total wages paid.
					Total.	Men.	Women.	Children under 16 years.	Men.	Women.	Children under 16 years.	
1	$1,500,000	$232,004	$667,135	52	926	425	494	7	$ 7 80	$ 5 40	$3 85	$290,164
2	1,800,000	591,843	1,111,955	52	1,325	630	530	165	6 58	4 90	2 45	356,690
3	1,963,644	892,652	1,416,338	51	1,483	598	793	92	6 81	5 63	2 78	449,543
4	100,000	10,500	22,500	*16	100	40	55	5	7 50	6 00	4 00	6,027
5	500,000	80,000	200,000	52	267	149	118	-	8 00	5 75	-	80,000
6	1,200,000	546,894	1,358,842	52	1,708	704	1,004	-	8 04	6 18	-	596,495
7	788,500	242,078	500,000	51	704	333	319	52	7 32	5 50	2 72	218,779
8	1,000,000	499,926	927,560	51	1,195	523	640	32	8 00	5 50	2 20	341,061
9	340,000	73,177	182,800	52	222	80	125	17	7 60	6 70	3 00	67,862
10	2,342,881	1,032,689	1,689,024	51	1,754	629	1,036	89	7 14	5 78	2 93	549,690
11	1,000,000	244,884	534,034	52	700	235	455	10	8 54	6 37	3 60	188,796
12	1,100,000	388,082	725,674	48	1,025	455	500	70	7 50	4 50	3 00	277,674
	$13,645,025	$4,834,729	$9,336,462	50.9	11,409	4,801	6,069	539	7 46	5 63	$2 90	$3,422,781

*Shut down.

Comparisons are made of the results of the above table and those obtained from similar tabulations of 1897 and 1898, with those given by the United States census reports of the cotton

industry for the State in 1880 and 1890. The two main items entering into the production of cotton goods are raw material and labor. Outside of these, which we lump together under the name of "margin," are included interest on capital invested, wear and tear of machinery, taxes and insurance, repairs of buildings, salaries, breakage and waste, profits, etc. Taking the value of the product as a basis, the following table will show the percentages of the three items, raw material, wages and margin at the dates indicated.

Items.	1880.	1890.	1897.	1898.	1899.
Raw material	55.0	55.2	57.9	52.4	51.8
Wages	22.0	28.5	33.1	34.8	36.6
Margin	23.0	16.3	9.0	12.8	11.6
Totals	100	100	100	100	100

Referring to the above table, it will be seen that the percentage of raw material entering into a given product, which stood at 55 in 1880 and increased to 57.9 in 1897, has fallen off to 51.8 during the last two years. The percentage of wages shows a steady increase from 22 in 1880 to 36.6 in 1899, an increase of 14.6 in nineteen years. The percentage of margin which fell from 23 in 1880 to 9 in 1897, and increased to 12.8 in 1898, has again fallen to 11.6 during the past year.

The following table will show the average annual product and the average annual earnings per employe, including men, women and children, for the years named.

Per Employe.	1880.	1890.	1897.	1898.	1899.
Average annual product	$1,132 70	$1,094 61	$873 89	$777 98	$818 34
Average annual earnings	249 73	312 50	289 50	270 91	300 00

The average annual product per employe shows a constant decrease between 1880 and 1898, the fall off amounting to $345.72 during the eighteen years, but the past year shows an increase of $40.36. This increase in product, as well as the increase in average annual earnings, can readily be accounted for in the increased average running time of the mills.

In average annual earnings per employe there was an increase from 1880 to 1890 of $62.77, from 1890 to 1898 a decrease of

$41.59, and, during the past year, an increase of $29.09, a net increase since 1880 of $50.27.

As before indicated, ten of the twelve returns received this year, are from the same mills from which certain ten returns were received in 1898, and fair comparisons can be made between the results of the tabulation of these two sets of returns for 1898 and 1899, as follows:

Capital invested, 1898	$12,588,500
Capital invested, 1899	11,545,025
Decrease	$1,043,475
Cost of material used, 1898	$3,905,748
Cost of material used, 1899	4,201,763
Increase	$296,015
Total wages paid, 1898	$2,596,131
Total wages paid, 1899	2,956,311
Increase	$360,180
Value of product, 1898	$7,455,394
Value of product, 1899	8,076,754
Increase	$621,360
Average weekly wages of men, 1898	$7.45
Average weekly wages of men, 1899	7.40
Decrease	$ .05
Average weekly wages of women, 1898	$5.55
Average weekly wages of women, 1899	5.68
Increase	$ .13
Average weekly wages of children, 1898	$2.74
Average weekly wages of children, 1899	2.87
Increase	$ .13
Average number of men employed, 1898	3,933
Average number of men employed, 1899	4,111
Increase	178

Average number of women employed, 1898.....	5,025
Average number of women employed, 1899.....	5,114
Increase	89
Average number of children employed, 1898.....	625
Average number of children employed, 1899.....	459
Decrease	166
Average total number of employes, 1898.....	9,583
Average total number of employes, 1899.....	9,684
Increase	101
Average number of weeks in operation, 1898.....	47.2
Average number of weeks in operation, 1899.....	51.1
Increase	3.9

THE WOOLEN INDUSTRY.

In 1898, returns from twenty-two woolen mills were tabulated, but the present year twenty-seven complete returns were received. The following table will show the condition of the industry during the year ending June 30, 1899, and furnishes a basis from which comparisons are made with former years.

WOOLEN GOODS.

	Capital invested.	Cost of material used.	Value of product.	Number weeks in operation.	Average Number Hands Employed.				Average Weekly Wages.			Total wages paid.
					Total.	Men.	Women.	Children under 16 years.	Men.	Women.	Children under 16 years.	
1	$144,000	$129,348	$156,000	50	95	68	27	-	$8 36	$6 08	-	$35,170
2	100,000	120,412	260,421	48	124	94	30	-	8 00	5 77	-	44,409
3	150,000	152,300	206,100	47	142	76	66	-	8 00	6 50	-	48,590
4	84,800	240,142	374,021	52	192	168	24	-	7 50	4 75	-	71,407
5	50,000	102,275	203,193	52	107	68	38	1	7 90	6 00	$3 30	39,097
6	50,000	107,950	195,000	52	115	90	24	1	8 75	6 00	3 50	43,900
7	50,000	50,000	90,000	52	63	55	8	-	9 00	5 00	-	20,000
8	200,000	163,436	262,745	44	160	105	43	12	9 62	6 92	3 63	60,752
9	75,000	160,000	144,000	52	90	50	40	-	9 00	6 00	-	33,000
10	300,000	133,724	227,003	45	150	100	50	-	9 00	6 25	-	52,671
11	50,000	65,542	75,000	48	43	32	11	-	8 00	6 00	-	15,435
12	120,000	74,243	108,146	52	82	48	34	-	9 10	4 61	-	31,191
13	113,000	104,703	169,356	50	130	90	40	-	9 40	5 25	-	52,200
14	40,000	70,000	107,674	40	75	50	22	3	8 00	6 50	3 50	20,705
15	40,000	84,000	85,000	52	45	30	15	-	9 00	7 50	-	12,790
16	146,000	81,086	150,000	52	98	62	36	-	10 00	6 50	-	44,408
17	200,000	83,127	120,000	48	78	46	32	-	9 00	7 02	-	30,000
18	75,000	100,000	140,000	52	70	40	30	-	7 50	7 00	-	25,000
19	100,000	275,000	362,000	52	201	130	70	1	9 00	6 00	4 50	75,392
20	25,000	40,237	66,821	52	45	43	2	-	7 00	4 00	-	18,148
21	80,000	86,481	123,606	52	63	43	20	-	8 44	5 65	-	24,748
22	200,000	244,579	392,233	48	315	259	48	8	6 00	4 75	3 00	73,400
23	60,000	65,000	96,540	41	82	54	21	7	9 00	5 40	4 08	25,517
24	100,000	110,000	155,000	50	87	44	43	-	10 50	6 25	-	36,500
25	324,500	408,840	510,000	52	225	150	75	-	7 50	5 50	-	80,000
26	100,000	60,000	120,000	47	50	30	20	-	8 00	7 00	-	18,000
27	100,000	146,226	257,699	48	180	140	40	-	7 50	5 00	-	66,191
	$3,077,300	$3,343,651	$5,097,558	49.2	3,107	2,165	909	33	$8 26	$5 97	$3 57	$1,105,621

Similar tables are deduced and comparisons made as in the cotton industry. On the basis of the value of the product, the following shows the percentages of raw material, wages and margin at different periods.

Items.	1880.	1890.	1897.	1898.	1899.
Raw material	64.2	65.9	65.4	60.1	65.5
Wages	15.6	21.7	25.1	23.4	21.7
Margin	20 2	12.4	09.5	16.5	12.8
Totals	100	100	100	100	100

As compared with 1898, the percentage of raw material entering into the total product of 1899 has increased 5.4 per cent, while wages have decreased 1.7 and margin 3.7. It will be noticed that the percentages for 1899 are almost identical with those of 1890.

The average annual product and earnings per employe are shown as follows for the periods named.

Per Employe.	1880.	1890.	1897.	1898.	1899.
Average annual product	$2,160 28	$1,739 84	$1,389 86	$1,602 67	$1,635 40
Average annual earnings	337 51	377 03	348 79	375 20	354 71

The average annual product per employe, which fell off $770.42 between 1880 and 1897, shows an increase of $245.54 in the past two years, while the average annual earnings per employe, including men, women and children, show a fall off of $20.49 from 1898 and a gain of $5.92 over 1897, and are yet $17.20 above the figures of 1880, but are $22.32 below those of 1890.

Nineteen of the woolen mills furnished complete returns for both 1898 and 1899, and on the business of these nineteen mills the following comparisons are made between the two years.

Capital invested, 1898	$2,170,795
Capital invested, 1899	2,087,800
Decrease	$82,995
Cost of material used, 1898	$2,142,724
Cost of material used, 1899	2,187,288
Increase	$44,564

Total wages paid, 1898	$760,177
Total wages paid, 1899	763,117
Increase	$2,940
Value of product, 1898	$3,478,282
Value of product, 1899	3,375,659
Decrease	$102,623
Average weekly wages of men, 1898	$8.49
Average weekly wages of men, 1899	8.78
Increase	$ .29
Average weekly wages of women, 1898	$6.10
Average weekly wages of women, 1899	6.12
Increase	$ .02
Average weekly wages of children, 1898	$3.77
Average weekly wages of children, 1899	3.63
Decrease	$ .14
Average number of men employed, 1898	1,359
Average number of men employed, 1899	1,402
Increase	43
Average number of women employed, 1898	651
Average number of women employed, 1899	640
Decrease	11
Average number of children employed, 1898	16
Average number of children employed, 1899	18
Increase	2
Average total number of employes, 1898	2,026
Average total number of employes, 1899	2,060
Increase	34
Average number of weeks in operation, 1898	50.1
Average number of weeks in operation, 1899	49.4
Decrease	.7

THE BOOT AND SHOE INDUSTRY.

An attempt was made to gather similar facts in the boot and shoe industry as those obtained in the cotton and woolen industries, but not with equal success. Only six out of all of the shoe manufacturers in the State made returns sufficiently full to be of use in a tabulation. Though incomplete and unsatisfactory, they are here presented for what they are worth.

BOOTS AND SHOES.

	Capital invested.	Cost of material used.	Value of product.	Number of weeks in operation.	Average Number Hands Employed.				Average Weekly Wages.			Total wages paid.
					Total.	Men.	Women.	Children under 16 years.	Men.	Women.	Children under 16 years.	
1	$41,500	$390,604	$548,765	51	306	210	80	16	$10 00	$8 00	$4 00	$126,953
2	105,000	210,000	350,000	52	300	220	80	-	10 50	7 75	-	125,000
3	30,000	67,815	122,240	52	67	50	17	-	7 93	7 30	-	27,109
4	100,000	500,000	800,000	50	200	150	50	-	15 00	10 00	-	142,557
5	150,000	539,543	650,000	49	350	250	100	-	10 00	7 20	-	168,000
6	25,000	52,500	80,000	51	75	55	20	-	12 00	8 00	-	27,000
	$451,500	$1,760,462	$2,551,005	50.6	1,298	935	347	16	$10 93	$7 97	$4 00	$616,619

Deductions from the above table would show percentages of cost of material, wages paid, and margin, entering into the total product, as follows:

Percentage of raw material	69.0
Percentage of wages	24.2
Percentage of margin	06.8
	100.0

The average annual product per employe, including men, women and children would be $1,965.33; the average annual earnings per employe would be $475.05.

These averages in the shoe business for 1899 compared with those of the cotton and woolen industries for the same year, will be of interest and are as follows:

Per Employe.	Cotton.	Woolen.	Boots and shoes.
Average annual product	$818 34	$1,635 40	$1,965 33
Average annual earnings	300 00	354 71	475 05

FACTORIES, MILLS AND SHOPS BUILT DURING 1899.

In response to the following inquiries: "How many and what kinds of factories, mills or shops for manufacturing purposes, have been enlarged, completed, or are in process of erection during 1899?" "Estimated cost of same?" "Probable number of hands they will employ?" answers have been returned by the officers of nearly every city and town. One hundred and three cities, towns and plantations report building in this line as follows:

ANDROSCOGGIN COUNTY.

Towns.	Buildings.	What done.	Cost.	Help.
Lewiston	Cotton mill	Enlarged	$20,000	40
Mechanic Falls	Machine shop	Enlarged	600	6
Minot	Canning factory	New sheds	1,000	
Poland	Canning factory	Rebuilt	2,000	

AROOSTOOK COUNTY.

Ashland	Starch factory	New	2,000	12
Frenchville	Grist mill	New	800	3
Grand Isle	Shingle mill	New	1,500	10
Island Falls	Lumber mill	Enlarged	1,500	20
Island Falls	Lumber mill	Enlarged	800	8
Houlton	Starch factory	Improved	1,500	
Limestone	Starch factory	Rebuilt	3,500	11
Mapleton	Lumber mill	New	2,000	10
Masardis	Lumber mill	Enlarged	500	
Portgage Lake Pl.	Shingle and grist mill	New	1,000	12
Presque Isle	Flour mill	Machinery	2,500	2
St. Francis Pl.	Lumber mill	New	3,000	15
St. John Pl	Shingle mill	Rebuilt	1,200	20
Sherman	Creamery	New	2,500	4
Wallagrass Pl.	Lumber mill	Enlarged	1,000	10
Wallagrass Pl.	Lumber mill	New	1,300	7
Wallagrass Pl.	Blacksmith shop	New	200	1
Wallagrass Pl.	Carpenter shop	New	200	2
Washburn	Flour mill	New	5,000	3
Woodland	Woodworking shop	New	200	6

CUMBERLAND COUNTY.

Gorham	Electric plant	New	25,000	6
New Gloucester	Lumber mill	New	3,000	10
Portland	Smoke house and sale rooms	New	11,000	30
Portland	Bottling works	Enlarged	5,000	
Portland	Three coal hoists	New	28,000	18
Standish	Excelsior mill	New	6,000	40
Standish	Lumber and heading mill	New	1,000	2

FRANKLIN COUNTY.

Towns.	Buildings.	What done.	Cost.	Help.
Chesterville	Sleigh manufactory	Enlarged	$150	
Industry	Box and spool stock mill	New	1,000	15
Jay	Wood turning shop	New	10,000	30
Kingfield	Enamel mill.	Enlarged	800	10
New Sharon	Shoe factory	Machinery	5,000	35
New Vineyard	Novelty mill	Machinery	1,000	10
Phillips	Woolen mill	New	5,000	10
Phillips	Marble works	New	1,000	3
Phillips	Carriage shop	New	2,000	5

HANCOCK COUNTY.

Brooksville	Blacksmith shop	New	150	1
Bucksport	Tannery	Enlarged	10,000	55
Franklin	Stone mill	New	1,000	8
Lamoine	Lumber mill	New	1,500	15
Orland	Lumber mill	New	800	5
Swan's Island	Canning factory	New	700	50
Swan's Island	Sardine factory	Enlarged	250	
Tremont	Sardine factory	Rebuilt	10,000	80
Trenton	Lumber and box mill	New	10,000	30

KENNEBEC COUNTY.

China	Saw mill	New	500	2
Clinton	Grist mill	New		
Gardiner	Woolen mill	Started up	800	75
Litchfield	Wood turning shop	New	500	2
Waterville	Creamery	Rebuilt	2,500	6
Waterville	Machine shop	Enlarged	2,000	6
Waterville	Furniture factory	New	8,000	50
Waterville	Electric power station	New	40,000	10
Winslow	Pulp mill	New	250,000	90

KNOX COUNTY.

Rockland	Cooper shop	Enlarged		
Rockland	Lumber mill	New		
South Thomaston	Granite plant	New	10,000	60

LINCOLN COUNTY.

Boothbay	Two lumber mills	New	2,000	5
Boothbay Harbor	Five sardine factories	New	10,000	250
Bristol	Canning factory	Rebuilt	1,000	50
Somerville	Lumber mill	Enlarged	400	10
Wiscasset		New	5,000	3

OXFORD COUNTY.

Andover	Birch mill	New	2,000	10
Brownfield	Grist mill	Added	200	1
Canton	Tannery	Enlarged	1,500	
Canton	Butter factory	New	2,000	20
Canton	Planing mill	Machinery	100	
Mexico	Wood novelty mill	New	1,500	5
Oxford	Electric power plant	New	2,000	1
Paris	Wood novelty mill	Enlarged	4,000	
Peru	Grist mill	New	200	1
Roxbury	Wood novelty mill	Rebuilt	6,000	50
Rumford*	Paper bag mill	New	1,250,000	600
Rumford	Paper mill	Additions		
Rumford	Pulp mill	Additions		
Stow	Dowell mill	New	4,000	12
Stoneham	Spool stock mill	New	1,000	15

* See note, page 20.

PENOBSCOT CCUNTY.

Towns.	Buildings.	What done.	Cost.	Help.
Brewer	Pulp mill	Enlarged	$15,000	
Corinth	Butter factory	New		
Corinth	Lumber mill	New	8,000	100
Corinth	Planing and grist mill	New		
Corinth	Grist mill	New		
Eddington	Wood and iron shop	New	400	2
Howland	Pulp mill	Addition	15,000	
Kingman	Kindling wood factory	New	1,500	20
Milford	Iron foundry	New	2,000	10
Millinockett*	Pulp mill	New	4,000,000	500
Millinockett	Lumber mill	New		
Old Town	Woolen mill	New	85,000	75
Springfield	Starch factory	New	1,200	7

PISCATAQUIS COUNTY.

Greenville	Veneer mill	Enlarged	800	5
Milo	Lumber mill	Machinery	850	10

SAGADAHOC COUNTY.

Topsham	Lumber mill	New	1,500	6

SOMERSET COUNTY.

Athens	Can stopper factory	New	1,000	3
Hartland	Woolen mill	Machinery	1,000	35
Madison	Pulp mill	Rebuilt	500,000	150
Madison	Pulp mill	New	50,000	
Madison	Woolen mill	Addition	2,500	
New Portland	Novelty mill			
New Portland	Saw mill		1,200	6
New Portland	Grist mill			
Skowhegan	Worsted mill	Machinery	12,500	75

WALDO COUNTY.

Burnham	Skirt factory	New	500	50
Frankfort	Granite plant	Shed & m'ch'y	15,000	200
Morrill	Hoop mill	New	700	3
Unity	Canning factory	New	1,000	20

WASHINGTON COUNTY.

Calais	Shoddy mill	New	400	15
Cherryfield	Trousers factory	New	2,500	30
Dennysville	Lumber mill	Rebuilt	1,000	15
East Machias	Wood novelty mill	New	400	10
Eastport	Shook mill	New	25,000	250
Eastport	Sardine factory	New	15,000	
Jonesport	Smoke house	New		
Jonesport	Sardine and clam canning	New	40,000	400
Jonesport	Sardine factory	Enlarged		
Lubec	Two sardine factories	Enlarged		
Lubec	Three sardine factories	New	90,000	300
Lubec	Smoked herring stand	New		
Machiasport	Sardine factory	New	10,000	200
Meddybemps	Short lumber mill	New	600	8
Robbinston	Shook mill	New	600	3
Roque Bluffs	Stone mill	New	1,500	7
Whiting	Box mill	Repaired	200	6

*See note, page 20.

YORK COUNTY.

Towns.	Buildings.	What done.	Cost.	Help.
Berwick	Planing mill	New	$1,500	5
Biddeford	Lumber mill	New	40,000	100
Hollis	Woolen mill	Repaired	25,000	40
Kennebunk	Shoe counter factory	Enlarged	5,000	150
Kennebunk	Fiber goods manufactory	Enlarged	4,000	
Limerick	Woolen mill	Renewed	12,000	100
Sanford	Worsted mill	Enlarged	5,000	50
Waterboro	Two saw mills	New	2,000	20

RECAPITULATION.

Counties.	Number of towns.	Number of buildings.	Total cost.	Hands employed.
Androscoggin	4	4	$23,600	46
Aroostook	16	20	32,200	156
Cumberland	4	7	79,000	106
Franklin	7	9	25,950	118
Hancock	8	9	34,400	244
Kennebec	6	9	304,300	241
Knox	2	3	10,000	60
Lincoln	5	5	18,400	318
Oxford	11	15	1,274,500	715
Penobscot	9	13	4,128,100	714
Piscataquis	2	2	1,650	15
Sagadahoc	1	1	1,500	6
Somerset	5	9	568,200	269
Waldo	4	4	17,200	273
Washington	12	20	187,200	1,244
York	7	8	94,500	465
Total	103	138	$6,800,700	4,910

TOTALS FOR NINE YEARS.

Years.	Number of towns.	Number of buildings.	Total cost.	Hands employed.
1891	86	110	$3,023,850	4,278
1892	89	114	2,128,000	4,312
1893	81	108	841,725	2,526
1894	48	55	663,700	1,039
1895	75	102	1,367,800	2,797
1896	62	77	1,055,900	1,470
1897	74	95	827,600	2,339
1898	64	72	675,100	2,024
1899	103	138	6,800,700	4,990

NOTE—As Millinockett has no municipal officers, and the assessors of Rumford failed to return an estimate of the cost of mill improvements in that town, the estimates for both places, except the probable number of hands the improvements in Rumford would provide work for, were obtained from well informed private individuals. Parties interested in these improvements in both places were communicated with, but in each case failed to supply the needed information.

A CORNER IN BURMAH SLATE QUARRY—MONSON.

THE SLATE INDUSTRY.

The manufacture of roofing slate in Piscataquis county, has been carried on to a greater or less extent for about fifty-five years. From the days of the first settlements of this region, which commenced very early in the century, the outcroppings of ledge which underlies the soil were noticed to be very soft and free rifted, and large pieces were split out with "frow and maul," and used as hearth stones in the cabins of early settlers, while smaller pieces were split thin and smoothed with crude tools and used in their irregular shape and without frames, as school slates. But it was nearly forty years after the first settlement at Brownville, when the idea of making "slate shingles" or roofing slate assumed a tangible form. The Bangor and Piscataquis Slate Company made the first move early in 1843. The following is taken from the earliest records of the doings of this company:

January 14, 1843. Bonded the farm.

August 19, 1844. Commenced on ledge with three men.

December 19, 1844. First two loads slate.

This quarry is near the village, and is now known as the Brownville, Maine Quarry. It was long known as the Crocker Quarry.

Adams H. Merrill opened a quarry on the town line between Brownville and Williamsburg in 1846. This is less than two miles from Brownville village, and is now the property of the Monson Maine Slate Company.

It was not until 1870 that the manufacture of slate was begun in Monson. Although attempts have been made to extend the business into Williamsburg, Barnard, Blanchard, Shirley and other towns on the slate belt, and in some places quarries have been worked for several years at a time, the industry is now

confined to the towns of Brownville and Monson. In the former town three quarries are in operation, engaged wholly in making roofing slate, while in Monson four quarries are being worked, all of which, in addition to roofing slate, make a specialty of getting out mill stock. This is comparatively a new industry. The rough stone, as it is taken from the quarry in large or small sheets, is worked up in the mill by saw and planer into such variety of size and thickness as it can be economically worked, and finds a ready market at remunerative prices.

The annual output of roofing slate in the county is now about 37,000 squares; 25,000 at Brownville and 12,000 at Monson. The output of mill stock, which is confined to the town of Monson, now amounts to about 325,000 feet, board measure.

Wages do not vary much in the different quarries, being $1.50 per day for common laborers and $2.00 for skilled labor, and a crew will average $1.75 per day.

The average number of men employed at the quarries in both towns, aggregates 325; about 180 at Brownville and 145 at Monson. The daily pay roll is $568, and reckoning 300 working days in the year, the sum annually paid out in wages would amount to $170,000.

The quarries now being worked at Brownville are:

The Brownville, Maine Quarry, formerly the Bangor and Piscataquis, and later known as the Crocker Quarry.

The Merrill Quarry, now run by the Monson Maine Slate Company.

The East Brownville Quarry, formerly known as the Highland Quarry.

Those run at Monson are:

The Monson Pond Quarry run by the Monson Maine Slate Company.

The Hillside Quarry.

The West Monson Quarry. The two latter run by the Monson Consolidated Slate Company.

The Burmah Quarry, run by the Monson-Burmah Slate Company.

In addition to the mill at the Burmah quarry for getting out mill stock, the Monson-Burmah Slate Company have a large factory in Portland which takes the entire output of its quarry,

besides purchasing large quantities of mill stock from the product of other quarries. As this is a comparatively new and growing industry and one that is likely to steadily increase, a description of the plant will be of interest. It is located at 291 Commercial street. The building is 200 feet in length by 75 feet in width, covering 15,000 square feet of surface, and is completely fitted up with the latest and most approved machinery. The machinery used is very similar to that in a wood working plant, consisting of planers, drillers, matchers, band saws, buzz saws, etc., for slate can be sawed, planed and worked similar to wood, though not so rapidly.

The Monson-Burmah Slate Company was incorporated in 1894, and the officers are as follows:

M. W. Clark, President.

L. G. Paine, Secretary and Treasurer.

E. A. Bullard, Superintendent of Roofing Department.

Geo. H. Wilkins, Superintendent of Manufacturing Department.

Fred J. Wilkins, Superintendent of Quarries.

The work of making slate into articles of utility other than roofing slate, was begun at Monson in a small way some twelve years ago, inkstands and a few other articles being made and sold to summer visitors. The demand for the goods increased year by year until now the volume of business resulting from the mill stock produced at all the Monson quarries approximates, in its manufactured state, $100,000. The capital invested is $75,000. An average crew of 13 men are employed through the year and wages average $9.00 per week. The work is practically all done by machinery so that a few men can turn out a very large product.

One of the leading specialties of this plant is switch boards for electrical plants, this slate being very desirable for the purpose on account of its freedom from iron and other metallic substances. Probably not less than a thousand different varieties of useful articles are here manufactured. Slate is largely taking the place of marble, and it has this great advantage; it never stains. It is not only used in its natural color, but can be marbleized, giving it any shade of color or style of figure desired. The use of wood for interior finish and for the manufacture of many

utensils for furnishing public buildings and private residences, is being displaced by slate, and although the first cost may be a little higher than wood in some instances, the durability and beauty of finish of the slate make it preferable for permanent work.

Of other leading articles here made of slate, may be mentioned table tops, laundry and kitchen tubs and sinks, tanks of all kinds, counter tops, urinal stalls, floor tiling, school blackboards, mantels, wainscoting, etc., while hundreds of others not less important, are working their way into the markets of the country and building up a permanent business for the promoters of this enterprise.

Both the Monson Maine Slate Company and the Monson Consolidated Slate Company, get out at their quarry mills a very much larger amount of mill stock than the Monson-Burmah Slate Company, a large portion of which is here finished and shipped directly to consumers. This branch of the slate industry has expanded rapidly within the last few years, and, in connection with roofing slate, promises greater importance to the slate business of our State.

STOREHOUSE AT BURMAH SLATE QUARRY—MONSON.

THE LIME INDUSTRY.

Unlike the quarrying and cutting of granite, which is carried on in various localities along the entire Atlantic coast line of the State, and, in many sections, far into the interior, the quarrying and burning of lime is carried on in a comparatively limited territory, principally in the city of Rockland and the towns of Rockport, Thomaston and Warren, in the county of Knox, bordering on the westerly side of Penobscot bay. Except in the town of Warren, the kilns are all located along the water front where convenient wharves facilitate the shipping of the product by water, the most economical method of conveying it to market.

Although the area of territory from which lime rock may be profitably quarried is limited, yet it is large enough for all practical purposes. The supply is simply inexhaustible. When a quarry covering a surface of three or four acres, can be worked for a century, the thousand of acres in the vicinity will supply lime rock for all time to come.

The manufacture of lime for export, in what is now Knox county, dates back to about 1733, when Samuel Waldo shipped it in considerable quantities to the Boston market. The location where Waldo commenced operations, is said to be the old quarry now enclosed within the State Prison walls at Thomaston. After the establishment of the prison, this quarry was worked for many years by the convicts, but was long since abandoned and is now partially filled with water. From a crude beginning, the lime industry has kept pace with the times, and probably in no industry in the State is there more up-to-date machinery and appliances in use, than in quarrying and transporting the lime rock and converting it into lime. Where formerly the hand drill and blasting powder were used in loosening the rock from its native bed, now the most approved power drills, operated by

compressed air, are to be seen, and the more powerful and economical dynamite has taken the place of powder. Instead of hauling the rock with oxen up an incline, which at best was a slow and laborious process, the hoisting is now done by means of cable ways operated by electricity, and the rock dumped directly from the hoisting boxes into the cars. A broad gauge steam railway has taken the place of the slow carts in transporting the rock, which is fed direct from the cars into the latest and most approved kilns. The time taken to burn a kiln of lime has been reduced from five days and nights to one, by improved kilns, the substitution of coal for wood, and the forced draft operated by steam power. The lime business of Knox county is in the hands of broad-minded, far-seeing and thoroughly reliable business men, men capable of making a success of any legitmate business. Competition is sharp. Millions of barrels of inferior grades of lime, manufactured in other states and in the Maritime Provinces, are annually thrown upon the market at prices far below the cost of the Maine article, yet "Rockland Lime" is known and appreciated the county over, and holds its own in the markets at a fair margin of profit, against all competitors.

Among the considerable items of expense in the production of lime, is the cost of the fuel used in burning. Wood had always been used from the early days up to within a very few years. This was cut at first in the nearby forests and hauled by teams during the winter, but as the business increased, and wood in the vicinity became scarce, it was shipped from along the shores of the mainland and islands in the bay, and as time wore on and the forests along the shores became thinned, the cost of obtaining wood increased, and for many years large quantities were imported from the shores of New Brunswick and Nova Scotia where stumpage and wages were less than in Maine. But the time came when, on account of the sharp competition among the manufactories, not only in this country but in the Maritime Provinces of the Dominion of Canada, that the cost of manufacture in Knox county must be reduced, or the product would be driven out of the market. The matter of fuel was a perplexing question. Wood was costing too much, and

there was a widespread conviction that coal would not produce good lime, but some of the more venturesome commenced to experiment with it, and after more or less of failure, it was demonstrated that, with properly constructed kilns, a lime fully equal if not superior to that produced by wood could be burned with coal in a much shorter time and much less expense for fuel; so that within the last few years all of the larger operators have abandoned the use of wood and substituted coal. The soft or bituminous coal is the kind used. That used in Rockland and vicinity is imported from Cape Briton island, while the Rockport people use the Pennsylvania coal.

Some of the smaller operators are still using wood, but, doubtless, in a few years, the use of that article of fuel in burning lime in Knox county will be a thing of the past.

The lime rock used in the Rockland kilns is quarried partly in Rockland and partly in Thomaston, and a belt line of broad gauge steam railroad, which reaches all these quarries excepting two, now conveys the rock to the kilns. This line of railroad covers over eleven miles of track. At the present time there are in use three engines, twelve flat cars, and 401, of what is known as dump cars, from which the load can be quickly dumped instead of being thrown out by hand. Twenty men are employed whose weekly wages vary from $9.25 for common hands to $16.50 for engineers, averaging $10.30. Over $10,000 were paid this railroad force in wages during the past year.

Another quite large item of expense in the lime business is the cost of lime casks. A portion of these are made at the kilns by the manufacturers themselves. The staves and heading are purchased from different lumber mills, a large portion of them now coming from Washington county along the line of the Washington County Railroad. The hoops, which are of gray birch, are cut over quite a large area of territory in Knox and Waldo counties. But by far the larger part of the lime casks used are purchased from farmers of the country in the vicinity, many of them being hauled in a distance of from fifteen to twenty-five miles. These farmers are coopers as well, and during cold and stormy weather when farm work cannot be attended to, they work at making lime casks, and haul them to market in immense racks, one hundred to a load. These casks

have sold the past season at about 16½ cents each, while a year or two ago they were selling at from 13½ to 14 cents. Through the haying season there is always a scarcity of casks in the market from the fact that those who cooper and bring them in are too busy in their hay-fields to attend to outside matters. The cutting and shaving of hoops is quite an industry of itself, and extends still further back into country towns. The cutting of shook timber and the sawing of staves and heading is still more far reaching, much of it being transported long distances. The timber used for this purpose is of a quality that will not make first-class lumber and thus the fragments are gathered up that nothing be lost.

For the most part this lime is shipped by water, and requires a large fleet of vessels to convey it to market, while considerable quantities are shipped by rail over the Knox and Lincoln branch of the Maine Central Railroad and connecting lines. Thus one industry makes business for another.

The number of men employed in the production of lime in Knox county will not fall much short of 2,000 through the season. Nearly 1,000 more are engaged in its transportation, while hundreds find employment in cutting and sawing lumber into shooks, cutting and shaving hoops, and coopering and transporting casks.

The Cobb Lime Company of Rockland do, by far, the largest lime business in the county. They quarry their own rock and employ through most of the year from 400 to 450 men, running from 35 to 40 kilns. Their output in 1898 was 369,624 barrels, being considerably more than one-third of the Rockland output and more than one-fifth of that of the entire county.

The amount of lime burned from year to year is not uniform, yet the fluctuations have not been very marked. The following table will show the number of casks burned in the Rockland kilns during the past twelve years. It will be noted that the largest amount was burned in 1892, and the smallest in 1898.

Year.	No. casks of lime burned.
1887	1,388,413
1888	1,211,366
1889	1,348,187
1890	1,267,915
1891	1,415,117
1892	1,435,570
1893	1,248,394
1894	1,064,747
1895	1,265,740
1896	1,188,948
1897	1,179,302
1898	1,022,382

The number of casks of lime burned in Knox county during the season of 1898, was as follows:

In Rockland:		
A. J. Bird & Co.	71,125	
Joseph Abbott	42,312	
C. E. Dohorety	28,683	
Cobb Lime Company	369,624	
Farrand & Spear	65,932	
R. W. Messer	10,000	
A. F. Crockett & Co	124,970	
Perry Brothers	163,000	
White and Case	46,736	
A. C. Gay	100,000	
Total,		1,022,382
In Thomaston:		
J. O. Cushing & Co	150,000	
J. A. Creighton & Co	72,000	
Total,		222,000
In Rockport:		
S. C. & H. L. Shepherd Company	197,415	
Carleton, Norwood & Co	102,904	
G. E. Carleton & Co	92,680	
J. H. Eells	33,821	
Total,		426,820
In Warren:		
McLoon & Stover Lime Company		100,000
Total for county,		1,771,202

The value of this output at the kilns is something over a million of dollars, the larger part of which has been paid to workmen in wages. The rate of wages at Rockland is $1.75 per day for kiln tenders, and for workmen at the quarries, from $1.75 to $2.25, while foremen receive from $2.50 to $3.00. In some subdivisions of the work the pay is a little less in Rockport, owing to different conditions under which the men work.

The lime manufactured in Rockland is sold principally in New York city, while that from Rockport finds its market mostly in Boston. The larger part of the lime used in Maine is from Knox county, and is shipped direct to dealers in various parts of the State, yet this is but a small fraction of the output.

The busy season in the burning of lime commences the latter part of February and continues till near the end of the year. For the next two months not more than half a dozen kilns are kept burning on account of the demand being very light through the dead of winter. As lime deteriorates rapidly, the work of burning is gauged so that it may be put on the market in a fresh state.

The importance of the lime business as a State industry may be better comprehended when it is considered that the raw material is always at hand and in inexhaustible quantities, and that labor is a larger factor and the cost of material less than in almost any other business.

The S. E. & H. L. Shepherd Company of Rockport, have made very extensive improvements in their plant during the past year, and will increase their output about fifty per cent over their former normal product. At the Jacobs quarry, where their rock is obtained, can be seen some of the very best and up-to-date machinery and appliances. A new cable way for hoisting, furnished by the Lidgerwood Manufacturing Company of New York, has taken the place of the derrick, by which a much larger amount of rock can be hoisted in a given time than by the old methods. Where steam power was formerly used, electricity has been substituted. Two 50 horse power electric motors, furnished by the Knox Gas and Electric Company, are used for hoisting, and a 16 horse power motor for pumping, will force 275 gallons of water per minute a perpendicular height of 160 feet. What were formerly steam drills are now run by com-

pressed air, which is a great improvement in several ways over steam. The air is compressed for this purpose by a 22 horse power gasoline engine, and is carried through a two and one-half inch pipe a distance of from five hundred to six hundred feet from the bank where the compressor is located to the pit where the drills are worked. This quarry, as now equipped, has a capacity of 1,000 barrels of lime per day.

Their wharf is being extended fifty feet, the front and sides being of granite, filled in with the waste rock from the quarry. This will give a depth of twenty feet of water at ordinary tide, which will enable them to use a larger class of vessels for shipping their lime. Several of the kilns, as an experiment, have been fitted with a new method of drawing the lime. The ordinary method being to draw out the burned rock from one side at the bottom of the kiln by means of a long iron rod hooked at the end, but these new kilns are fitted with a tunnel shaped delivery at the bottom under which a wheelbarrow is set. The otherwise open bottom of the tunnel is kept closed by a huge pair of shears fixed in position, which, when opened, allow the burned rock to run out and fill the wheelbarrow, then the shears are closed until this barrow is pulled away when another takes its place, and the operation is repeated until the kiln is all drawn. Since the late enlargement of this plant eight kilns are run. A 100 horse-power boiler is here used, carrying from 40 to 45 pounds of steam, for a forced draft in the kilns. Another boiler of the same capacity is held in reserve to be used in case of accident so that no time should be lost in waiting for repairs. Where in former years five days and nights were required to burn a kiln of lime, now, with improved kilns and the forced draft, a kiln is ready to be drawn in twenty-four hours from the time the fire is started. At this plant wood is used only for starting fires, coal now being the principal fuel, which is brought by water from Pennsylvania. The wages paid to kiln tenders are at the rate of $1.50 per day, with four men at a kiln.

THE PULP AND PAPER INDUSTRY.

Maine now stands second in the United States in the amount of pulp and paper produced daily, New York being first. When the Great Northern Paper Company have completed their immense plants at Millinockett and Madison, it is very likely that Maine will head the list of states in our country that are engaged in the manufacture of pulp and paper. This great industry has been almost entirely developed since the civil war, and the greater part of it since 1880. In that year, the census figures give seven pulp mills in Maine, with a capital invested of $440,000, and twelve paper mills, with a capital of $2,000,000 invested.

In 1895 the Maine bureau of industrial and labor statistics made a partial report of the industry and found about $13,000,000 invested. With the completion of the two great plants above mentioned and that of the sulphite mill of the Hollingsworth & Whitney Company at Winslow, it is safe to say that the capital invested at the present time is fully $30,000,000. The daily output in 1895 was 2,400,000 pounds or 1,200 tons. The daily output at the present time, without including that of the plants now in process of construction, is 3,670,000 pounds or 1,835 tons. If we include the output of the three plants now building we shall have a daily output of 4,330,000 pounds or 2,165 tons.

There is paid out daily for labor in the pulp and paper mills of the State the sum of $15,000, making the enormous aggregate of $5,000,000 yearly in direct wages to employes. To this sum should be added the cost of the wood used, which at present is about 275,000,000 feet. This at $9.00 per thousand feet would amount to about $2,500,000 more. Including the mills now building, the above figures would be increased as follows: paid

out daily for labor, $16,200; paid out yearly for labor, $5,360,000; number of feet of lumber used 350,000,000; this at a cost of $9.00 per thousand feet would amount to $3,150,000.

Truly this business may rightfully be termed the imperial industry of Maine. Following, we present a list of the pulp and paper mills in the State, their equipment, daily output, and other facts of interest in connection with them. It should be explained that some plants are combination mills, that is, they are composed of a ground wood pulp mill, a chemical fiber mill and a paper mill. In the list presented below we count each department as a mill, as it would be impossible to describe them otherwise. Separating them in this manner we find the whole number of pulp and paper mills in the State to be fifty-eight, as follows:

PULP AND CHEMICAL FIBER MILLS.

Augusta—Kennebec County.

Cushnoc Paper Company, two mills: Sulphite mill. Two digesters, two 76 inch wet machines. Power, water. Product, sulphite fiber, dry, 24,000 pounds in 24 hours.

Augusta pulp mill. Six New England grinders, two 80 inch wet machines. Power, water. Product, wood pulp, dry, 10,000 pounds in 24 hours. Uses about 15,000 feet of spruce wood daily. Runs the year round. On Kennebec river.

Benton Falls—Kennebec County.

Kennebec Fiber Company. Two grinders, three wet machines. Power, water. Product, wood pulp, 15 tons daily. Wood used, mostly spruce, some pine, fir and hemlock. Number of hands, about 80. On Sebasticook river. Charles D. Brown, Boston, President; E. W. Heath, Waterville, Treasurer.

Brunswick—Cumberland County.

Androscoggin Pulp Company. Three New England grinders, five wet machines. Power, water. Product, wood pulp, about 8 tons daily. Wood used, spruce, pine and poplar. Number of hands, 30. Mill built in 1865, on the Androscoggin river.

Chisholm—Franklin County.

International Paper Company. Otis Mill. Fifty-four grinders, nine wet machines. Power, water and steam. Product, wood pulp, dry, 400,000 pounds in 24 hours. Mill built in 1888. On Androscoggin river.

Cumberland Mills—Cumberland County.

S. D. Warren & Company. Chemical Fiber Mill. Soda fiber. Power, water and steam. Product, 50,000 pounds in 24 hours. Wood used, 50 cords poplar wood daily, and 30,000 pounds rags, mostly foreign. Mill on the Presumpscot river. J. E. Warren, Agent.

Embden—Somerset County.

International Paper Company. Solon Mill. Twelve grinders, nine 72 inch wet machines. Power, water. Product, wood pulp, 100,000 pounds in 24 hours. Wood used, spruce. Number of employes, 65. On the Kennebec river.

Enfield—Penobscot County.

International Paper Company. Piscataquis Mill. Eleven New England grinders, eight wet machines. Power, water. Product, wood pulp, dry, 90,000 pounds in 24 hours. Number of employes, 76. Mill built in 1888-9. On the Penobscot river.

Fairfield—Somerset County.

Somerset Fiber Company. Two 62 inch cylinders. Power, water. Product, soda fiber, 30,000 pounds in 24 hours. Wood used, 35 cords spruce daily. Mill built in 1881. Number of hands employed, 100. On Kennebec river.

Great Works—Penobscot County.

Penobscot Chemical Fiber Company. Seven 4,000 pound engines, eight digesters, one 84 inch double cylinder. Power, water. Product, soda fiber, 80,000 pounds in 24 hours. Number of employes, 130. Poplar wood used. On Penobscot river. Arthur W. Clapp, Boston, Agent.

Howland—Penobscot County.

The Howland Pulp Company. Howland Pulp Mill. Six digesters, four wet machines. Water and steam power. Prod-

uct, sulphite fiber, 80,000 pounds in 24 hours. Wood used, spruce, about 14,000,000 feet yearly. Number of employes, 125. Lumber from Maine forests. On Penobscot river. John C. Jearell, Manager.

Jay Bridge—Franklin County.

International Paper Company. Falmouth Mill. Thirteen grinders, four wet machines. Water and steam power. Product, wood pulp, dry, 50,000 pounds in 24 hours. Wood used, spruce, 12,000 feet daily. Number of employes, 135. On the Androscoggin river.

Lincoln—Penobscot County.

Katahdin Pulp and Paper Company. Katahdin Mill. Four digesters, one 112 inch dry machine. Power, water and steam. Product, sulphite fiber, 60,000 pounds in 24 hours. Number of employes, 107. Wood used, 9,000,000 feet spruce wood yearly. Thomas B. Draper, President; N. M. Jones, Manager; John W. Flint, Treasurer.

Lisbon Falls—Androscoggin County.

Lisbon Falls Fiber Company. Three wet machines. Power, water. Product, sulphite fiber, 60,000 pounds in 24 hours. Number of employes, 75. Wood used, 50 cords spruce daily. On the Androscoggin river.

Livermore Falls—Androscoggin County.

International Paper Company. Umbagog Mill. Eight grinders, four wet machines. Power, water. Product, wood pulp, dry, 40,000 pounds in 24 hours. Wood used, spruce, poplar, pine and fir, about 13 cords daily. Number of employes, 56. On Androscoggin river.

Madison—Somerset County.

Great Northern Paper Company. Wood Pulp Mill. Eight grinders, 5 wet machines. Power, water. Product, forty tons in 24 hours.

Sulphite Mill. Ten digesters, three wet machines. Forty tons of sulphite fiber in 24 hours. Wood used, 15,000,000

feet of spruce yearly. Water power. On Kennebec river. Mill first erected in 1891 and came into possession of Great Northern Paper Company in 1899.

Orono—Penobscot County.

International Paper Company. Webster Mill. Seven grinders, three wet machines. Power, water. Product, wood pulp, 60,000 pounds in 24 hours. Mill built in 1895. On Penobscot river.

Orono Pulp and Paper Company. Orono Mills. Five digesters, two wet machines. Steam power. Product, sulphite fiber, 50,000 pounds in 24 hours. Plant located at Basin Mills. Wood used, spruce and hemlock, about 6,500,000 feet yearly. Use all the waste of Walker's lumber mill, which amounts to about one-half the quantity required. Near the Penobscot river. B. B. Thatcher, Bangor, President; R. W. Sawyer, Bangor, Treasurer.

Riley—Franklin County.

International Paper Company. Riley Mill. Twenty-two grinders, fourteen wet machines. Power, water. Product, wood pulp, 200,000 pounds in 24 hours. Mill built in 1897-8. Wood used, 54,000 feet spruce, daily. Number of employes, 120. On Androscoggin river.

Rumford Falls—Oxford County.

International Paper Company. Rumford Falls Mill. Sixteen grinders, twelve wet machines. Power, water. Product, wood pulp, 180,000 pounds in 24 hours. On Androscoggin river.

Sulphite Mill. Six digesters, seven wet machines. Power, water and steam. Product, sulphite pulp, 140,000 pounds in 24 hours. Wood used, 100,000 feet of spruce daily for both mills. On Androscoggin river.

Skowhegan—Somerset County.

Richards Paper Company. Four New England grinders, two 62 inch wet machines. Product, wood pulp, 16,000 pounds in 24 hours. Wood used, spruce, 2,000 cords yearly. Number of employes, 15. Power, water. On Kennebec river. F. R. Philbrick, Superintendent.

Skowhegan Pulp Company. Three grinders, seven 76 inch wet machines. Power, water. Product, wood pulp, 40,000 pounds in 24 hours. Wood used, 3,000,000 feet spruce yearly. Number of employes, 30. Mill built in 1888. F. E. Heath, Manager.

South Brewer—Penobscot County.

Eastern Manufacturing Company. Two digesters, three wet machines. Power, steam. Product, sulphite fiber, 50,000 pounds in 24 hours. Wood used, spruce, 13,121 cords yearly. Waste material from saw mills wholly. F. W. Ayer & Company, Owners.

South Gardiner—Kennebec County.

Sulphite Mill. Four digesters, one 86 inch Fourdrinier machine. Product, sulphite fiber, 50,000 pounds in 24 hours. This mill has just been purchased by the International Paper Company, and will be enlarged and put in running order at once.

South Windham—Cumberland County.

Sebago Wood Board Company. Seven New England grinders, one 62 inch and one 72 inch wet machines. Product, wood pulp, 16 tons daily. Wood used, spruce, poplar and pine, 17 cords daily. Number of employes, 65. On the Presumpscot river. Mill built in 1875. Charles A. Brown, Treasurer.

Topsham—Sagadahoc County.

Pejepscot Paper Company. Pejepscot Mills. Sixteen grinders, ten wet machines. Power, water. Product, wood pulp, 180,000 pounds in 24 hours. Number of hands employed, 90. Wood used, 80 cords of spruce daily, obtained in Canada. Mill built in 1893.

Winslow—Kennebec County.

Hollingsworth & Whitney Company. Mohegan Pulp Mill. Eighteen grinders, fourteen wet machines. Power, water. Product, wood pulp, 120,000 pounds in 24 hours. Mill built in 1892. Sulphite mill now building. Wood used, 23,000,000 feet spruce yearly. On Kennebec river.

Algonquin Sulphite Fiber Mill. Two digesters, four wet machines. Power, water and steam. Product, sulphite fiber, 80,000 pounds in 24 hours. On Kennebec river.

Yarmouthville—Cumberland County.

Forest Paper Company. S. D. Warren & Company. Five wet machines, one 66 inch and one 118 inch dry machines. Power, water and steam. Product, 90,000 pounds soda fiber in 24 hours. Mill built first in 1872. Wood used, 20,500 cords poplar wood yearly. Number of employes, 160. On Royal river. G. W. Hammond, Agent.

PAPER MILLS.

Auburn—Androscoggin County.

Auburn Leather Board Supply Company. F. H. Fellows, owner. Three 500 pound beating machines, one 44 inch wet machine. Power, water. Product, leather board, 2,000 pounds in 24 hours.

Augusta—Kennebec County.

Cushnoc Paper Company. Fred S. Lyman, President; M. S. Holway, Vice President. One 750 pound and three 2,000 pound engines; one 86 inch and one 96 inch Fourdriniers. Power, water and steam. Product, manila paper. Specialties, envelope, bag and white sulphite papers. Number of employes, 100 in the whole plant. About 18 tons of paper daily.

Belfast—Waldo County.

Sherman & Company. Belfast Mills. Three mills. Four 300 pound, one 500 pound, three 700 pound and two 800 pound engines; three 42 inch machines. Power, water. Product, leather board, 6,000 pounds in 12 hours.

Benton Falls—Kennebec County.

Kennebec Fiber Company. C. D. Brown, President; E. W. Heath, Treasurer. Office, Waterville. Six 700 pound and four Jordan engines. One 72 inch, one 90 inch cylinder. Power, water. Product, wood pulp board, 24,000 pounds in 24 hours. Number of employes, about 80 in the plant. On the Sebasticook river.

Brunswick—Cumberland County.

Androscoggin Pulp Company. William A. Russell, President; E. B. Denison, Treasurer. Five wet machines. Power, water. Product, wood pulp board, 10,000 pounds in 24 hours. Number of employes, 30. Mill built in 1865.

Chisholm—Franklin County.

International Paper Company. Office, 30 Broad street, New York. Otis Mill. Eight 1,000 pound, six 1,400 pound and eight refining engines; one 86 inch, one 96 inch, one 110 inch, two 120 inch, two 126 inch, and one 135 inch Fourdriniers. Power, steam and water. Product, news paper, 320,000 pounds in 24 hours. Number of employes, 400. Mill built in 1891-2; enlarged in 1895 and 1897. On Androscoggin river.

Cumberland Mills—Cumberland County.

S. D. Warren & Company. Samuel D. Warren, Mortimer B. Mason, Fiske Warren, Boston. Three mills. Cumberland Mills. Eleven 350 pound, twenty-one 400 pound, twelve 800 pound, seven 1,000 pound, five 1,200 pound, two 2,000 pound, and twelve Jordan engines; one 40 inch, one 56 inch, three 68 inch, one 80 inch, one 82 inch, one 84 inch, one 90 inch and one 96 inch Fourdriniers; one 54 inch Four cylinder. Width of super calenders, 54 inches. Power, water and steam. Product, book and coated paper, 120,000 pounds in 24 hours; wrapping paper, 15,000 pounds in 24 hours. Number of employes, 825; men, 675; women, 150. John E. Warren, Agent, Cumberland Mills. On the Presumpscot river, six miles from Portland.

East Poland—Androscoggin County.

National Fiber Board Company. Emery Andrews, President; Stephen Moore, Treasurer. Boston office, 108 Lincoln street. Little Androscoggin Mill. Eight 400 pound, two 500 pound, and two 2,000 pound engines; three 42 inch, and two 48 inch cylinders. Power, water. Product, leather board, 14,000 pounds in 24 hours.

Gardiner—Kennebec County.

S. D. Warren & Company. H. E. Merriam, Agent. Copsecook Mill. Seven 400 pound, five 1,000 pound, and two Jordan

engines; one 84 inch and one 90 inch Fourdriniers. Width of super calenders, 44 inches. Power, water and steam. Product, book paper, 32,000 pounds in 24 hours. Number of employes, 115; men, 82; women, 33. Mill built in 1852; sold to Hollingsworth & Whitney in 1865; enlarged in 1891. On Cobbosseecontee river.

Hollingsworth & Whitney Company. Sumner Hollingsworth, President; Charles A. Dean, Vice President; E. B. Eaton, Treasurer; Boston. Two mills.

Cobbossee Mill. Ten 1,000 pound Horne and two Jordan engines; one 94 inch Fourdrinier and one 62 inch double cylinder. Power, water and steam. Product, manila paper, 40,000 pounds in 24 hours.

Aroostook Mill. Eight 1,000 pound, and one Jordan engines; one 90 inch Fourdrinier. Power, water and steam. Product, manila paper, 16,000 pounds in 24 hours. Number of employes, 100 in both mills; 80 men, 20 women. Mill first built in 1866; sold to Hollingsworth & Whitney in 1877. On the Cobbosseecontee river.

Jay Bridge—Franklin County.

International Paper Company. Falmouth Mill. Two 600 pound, two 800 pound, four 1,000 pound, and two refining engines; one 86 inch, one 100 inch, one 110 inch and one 120 inch Fourdriniers. Power, water and steam. Product, news paper, 120,000 pounds in 24 hours. Number of employes, 85. On Androscoggin river.

Kennebunk—York County.

National Fiber Board Company. Two 250 pound, and four 400 pound engines; two 40 inch cylinders. Power, water. Product, leather board, 5,000 pounds in 24 hours.

Lisbon Falls—Androscoggin County.

Lisbon Falls Fiber Company. Four 1,000 pound Horne, one 800 pound, one 1,000 pound and three Jordan engines; one 86 inch and one 108 inch Fourdriniers. Power, water. Product, news and manila paper, 50,000 pounds in 24 hours. Number of employes, 100; men, 94; women, 6. Mill built in 1888-9. On Androscoggin river. F. C. Whitehouse, Treasurer.

Livermore Falls—Androscoggin County.

International Paper Company. Umbagog Mill. Four 250 pound, one 500 pound, one 750 pound, one 1,000 pound, and four refining engines; one 72 inch and one 90 inch cylinders. Power, water. Product, wood pulp board, 30,000 pounds in 24 hours. Number of employes, 56. On Androscoggin river.

Mechanic Falls—Androscoggin County.

Poland Paper Company. William G. Davis, President; J. W. Leavitt, Treasurer; C. R. Milliken, Manager. Poland Mill. Fourteen 800 pound engines; one 68 inch, one 86 inch, one 88 inch and one 90 inch Fourdriniers. Width of super calenders, 50 inches. Power, water and steam. Product, book paper, 50,000 pounds in 24 hours. Number of employes, 115; men, 100; women, 15. Mill first built in 1857; Poland Paper Company commenced in 1887. On the Little Androscoggin river.

Orono—Penobscot County.

International Paper Company. Webster Mill. Two 1,000 pound Umpherston and two 1,600 pound Horne engines; one 96 inch and one 110 inch Fourdriniers. Power, water and steam. Product, news paper, 60,000 pounds in 24 hours. Number of employes, 80. Mill built in 1890. On the Penobscot river.

Orono Pulp and Paper Company. B. B. Thatcher, President; R. W. Sawyer, Treasurer; C. H. Sawyer, Manager. Orono Mill. Basin Mills. Five 1,200 pound engines, one 100 inch and one 110 inch Fourdriniers. Power, steam. Product, hardware and manila paper, 30,000 pounds in 24 hours. Number of employes in plant, 125; men, 117; women, 8. Mill near the Penobscot river.

Rumford Falls—Oxford County.

International Paper Company. Rumford Falls Mill. Ten 1,000 pound engines, one 110 inch, two 125 inch, one 135 inch, and one 162 inch Fourdriniers. Power, water. Product, news paper, 225,000 pounds in 24 hours. Number of employes, 350. Mill built in 1892. On Androscoggin river.

South Brewer—Penobscot County.

Eastern Manufacturing Company. F. W. Ayer, President; C. F. Woodard, Treasurer. Six 1,000 pound Horne, one 1,500

pound Emerson, and two refining engines; ne 112 inch machine. Power, steam. Product, fine manilla paper, 50,000 pounds in 24 hours. Number of employes, 193; men, 185; women, 8. Near Penobscot river.

South Windham—Cumberland County.

Sebago Wood Board Company. W. A. Russell, President; F. F. Brown, Treasurer. Windham Mill. Two 250 pound, two 1,000 pound, and one 1,600 pound Horne engines; two 72 inch cylinders. Power, water. Product, wood pulp board, 30,000 pounds in 24 hours. Number of employes, 65. Mill built in 1875. On the Presumpscot river.

Topsham—Sagadahoc County.

Bowdoin Paper Manufacturing Company. W. H. Parsons, President; F. C. Whitehouse, Vice President and Manager; W. W. Nearing, Secretary. Two mills, "A" and "B." Three 450 pound, four 500 pound, three 600 pound, and two 1,000 pound engines; one 70 inch Harper, one 60 inch, one 84 inch and one 96 inch Fourdriniers. Power, water. Product, news paper, 70,000 pounds in 24 hours. Number of employes 86 men, 9 women. Mill built in 1868. On Androscoggin river.

Pejepscot Paper Company. D. S. Cowles, President; F. C. Whitehouse, Treasurer; W. W. Nearing, Secretary. Six 1,500 pound beating, two refining engines; one 126 inch and one 145 inch Fourdriniers. Power, water and steam. Product, news paper, 130,000 pounds in 24 hours. Number of employes, 95. On Androscoggin river. Mill built in 1898-9.

Winslow—Kennebec County.

Hollingsworth & Whitney Company. Ticonic Mill. Fourteen 1,200 pound Horne engines, two 136 inch, and one 158 inch Fourdriniers. Power, water and steam. Product, manila paper, 170,000 pounds in 24 hours. Number of employes, 270; men, 250; women, 20. Mill built in 1892.

Among the additions and enlargements to pulp and paper mills in the State that are now in progress the following should be mentioned: The new sulphite mill of the Hollingsworth & Whitney Company at Winslow. The capacity of this mill will

be 60 tons of sulphite fiber daily. A new 158 inch paper machine is also being put into this plant. These additions will necessitate the employment of more labor and the use of more raw material. The output will be largely increased.

The Somerset Fiber Company at Fairfield are also making great additions and improvements to their plant.

The Great Northern Paper Company came into possession of all the property of the Manufacturers' Investment Company at Madison in July last. The former owners laid out nearly two million dollars here, their buildings, dam, etc., being built in the most solid and substantial manner possible. The main building of the plant is 900 feet in length. The Great Northern Paper Company paid $450,000 for the property, and have expended about $1,000,000 in improvements and repairs. The plant is now one of the best in the State. It started November 1, 1899. This mill will employ 200 hands at first, and will manufacture fifty tons of news paper daily. Undoubtedly the daily product will be much increased hereafter.

The Howland Falls Pulp and Paper Company are to build a new mill at Howland at once. The mill will be 100 feet in length and will be constructed of stone and brick. It is to be equipped with the latest and best machines known to the industry.

The International Paper Company are now engaged in enlarging their plant at Rumford Falls by the addition of two machine rooms, thus accommodating four new machines. They are also building a new boiler house, and adding a new machine room and four digesters to the sulphite mill. By these additions the capacity of the plant will be doubled. A short time ago the Continental Paper Bag Company was organized with an authorized capital of $5,000,000. The International Paper Company are erecting the buildings for this new industry, at Rumford Falls, in close proximity to the pulp and paper mills there. The completion of these plans means an addition of 500 employes to those already at work there, and the doubling of the population of Rumford Falls.

In the whole history of the pulp and paper industry, there has never been erected a plant on a more colossal scale than that in the process of construction at the present time at Millinockett. Millinockett is on the line of the Bangor & Aroostook Railroad,

about seventy-five miles northeast of Bangor. It is not far from South and North Twin lakes. It takes its name from Millinockett stream, the outlet of Lake Millinockett. This stream flows into the west branch of the Penobscot river. The immense plant of the Great Northern Paper Company is located on the Millinockett stream, which will be used as a tail race for the mills. Water will be taken from the west branch of the Penobscot river, a mile and a half away, and conducted by means of a canal to the brow of the hill that overlooks the Millinockett valley. This point is 114 feet above the bed of the Millinockett stream.

On its way the water will flood the intervening lowlands, thus forming an artificial lake of 250 acres. Five immense iron penstocks will be placed in position to receive the water from the canal, which, after affording the 15,000 horse power required for the great plant, will be discharged into the Millinockett stream, and following that stream down a few miles will find its way back into the west branch again. The scheme is a stupendous one, requiring courage as well as the highest engineering skill.

The Great Northern Paper Company is capitalized at $4,000,000, and it is thought by conservative men that fully that amount of money will be invested at Millinockett before the plant is completed and ready for business. All the buildings are to be composed of granite foundations, brick walls, steel skeletons, steel beams, concrete floors and steel trusses. The grinders of the wood pulp mill will run directly from the water wheels. The eight paper machines will be run by steam power. All the rest of the machinery will be run by electricity. There will be required for erecting the buildings about 6,500,000 bricks. The paper machines will be 152 inch Fourdriniers. The daily product will be 250 tons of news paper at first. The buildings will cover nearly six acres of land. We present the sizes of the various buildings, from which one can form some idea of the size of this giant plant.

Train shed, 290 by 50 feet, one story.

Finishing room, 290 by 100 feet, one story.

Machine room, 290 by 240 feet, one story with basement.

Beater room, 294 by 72 feet, one story with basement.

Screen room, 209 by 100 feet, two stories with basement.
Grinder room, 262 by 174 feet, one story.
Generator room, 109 by 51 feet, one story.
Storage room, 65 by 51 feet, one story.
Wood room, 182 by 125 feet, one story with basement.
Boiler house and coal burners 189 by 75 feet, one story.
Wood house, 119 by 64 feet, one story.
Filter house, 138 by 52 feet, one story.
Repair shop, 98 by 60 feet, one story.
Sulphite plant, lime house, 58 by 42 feet, one story with basement.
Sulphur house, 57 by 42 feet, one story with basement.
Acid room, 57 by 58 feet, one story with basement.
Sulphur burning room, 57 by 57 feet, one story.
Digester house, 86 by 39 feet, four stories with basement.
Blow pits, 83 by 79 feet, one story with basement.

The above will make five and four-tenths acres of roof surface. This plant will give employment to 500 hands in the mills, and will be the means of building up a village of 2,000 inhabitants in what was almost an unbroken wilderness less than a year ago.

SUMMARY.

Counting ground wood pulp mills, sulphite mills and paper mills separately, we find that there are 58 pulp and paper mills in the State, there being 30 pulp mills and 28 paper mills. These are comprised in 37 different plants. We find the total number of operatives in these mills to be 5,902 at present. When the plants now building and being enlarged are completed, the operatives will number over 7,000. We find the average daily wages paid operatives to be $1.62. This does not include the salaries paid officials. The whole sum paid in wages for labor in the pulp and paper mills, amounts yearly to over $5,000,000, and the cost of the wood used amounts to $2,500,000. We find that there are produced daily in the State, 600 tons of paper of all kinds, 735 tons of ground wood pulp, 330 tons of sulphite pulp, 110 tons of soda pulp, and 60 tons of leather board, making a production of 1835 tons of pulp and paper daily, and a total of 550,500 tons yearly.

Besides the operatives in the mills, there are thousands of men employed in cutting the wood in the forests, and in driving and conveying it to the mills. The above figures will be largely increased when the Great Northern Paper Company's plants at Millinockett and Madison are completed, and when the Continental Paper Bag Company's plant at Rumford Falls is ready for business.

Including these last named plants, we find the total amount of capital invested in the pulp and paper industry in Maine, will exceed $30,000,000. The total value of the various kinds of pulp and paper produced in the State annually amounts at present to about $17,916,000. This amount will be very largely increased when the plants now building are completed and in operation. It would probably be a conservative estimate, if the total value of the production should then be placed at $20,000,000, annually.

Three plants use poplar wood only in making pulp, namely: The S. D. Warren & Company's plant at Cumberland Mills, the Forest Paper Company, at Yarmouthville, and the Penobscot Chemical Fiber Company, at Great Works. The remaining plants use spruce wood mainly, although a few mills use small quantities of poplar, pine, fir and hemlock. One mill, that at South Brewer, uses only the waste of F. W. Ayer's great lumber mill in manufacturing pulp. The mill at Basin Mills derives about half its wood from Walker's lumber mill near by. The Cushnoc mill at Augusta has utilized the waste of the great lumber mill at Ashland to some extent.

There are two kinds of pulp, commonly designated as ground wood pulp, and chemical fiber. There are two methods of manufacturing chemical fiber, known as the sulphite process, and the soda process.

The process of manufacturing ground wood pulp is quite simple, although much power is required. The logs are sawed into bolts about two feet in length. The bark is removed from these bolts by holding them against a revolving disk having knife blades at intervals along its surface. This revolving disk is called a barker. The bolts are then placed sidewise in an iron enclosure that is adjusted to the grinder. The grinder is an immense sandstone wheel two feet in thickness. The bolts of

wood are kept close to this revolving stone, by means of pneumatic pressure, and are thus ground into pulp. The ground wood is strained through sieves which remove all splinters and unground particles. It is then transferred to the wet machine which converts it into sheets of wood pulp. These sheets are then subjected to enormous pressure, in order to remove the water to some extent, although it is impossible to press them dry. It takes great power to run the grinders, hence the desire of pulp manufacturers to have ample and never failing water power.

CHEMICAL FIBER OR PULP.

The process of manufacturing chemical pulp is entirely different from that of wood pulp. The wood is divested of bark, also in some mills the knots are cut or bored out. The wood then goes to the chipper where it is cut into very small pieces, not larger than comes from a planer in a woodworking mill. This chipped wood is then conveyed to the digester, an immense upright vessel of steel, sometimes 15 or 16 feet in diameter, and from 30 to 40 feet in length. The digester, being partly filled with wood, receives an acid or liquor from the great tanks, where it is made, till the wood is covered, when steam, under a pressure of about 100 pounds to the square inch, is admitted, and the wood is cooked in this manner for nine or ten hours, till it is thoroughly disintegrated, and all the resin, pitch, etc., of the wood dissolved into the liquor.

In the sulphite process, the acid is made somewhat as follows: Several tanks are filled with lime water of the desired strength, and then the fumes of sulphur, burning in iron retorts, or in a close walled chamber, are drawn through the lime water by means of exhaust pumps, till the water has absorbed the fumes to the requisite degree. The result is a powerful acid, which is capable, combined with the heat and pressure of steam, of completely disintegrating wood and separating from it everything but the pure wood fiber. When the wood is thoroughly cooked, the contents of the digester are blown into a vat with a sieve bottom where the liquor drains off. The wood fiber is then washed by admitting pure water, and this process is continued till all the impurities are removed and nothing but pure chemical

pulp remains. This pulp is then generally run through a paper machine which transforms it into rolls of paper, having about the thickness and consistency of common blotting paper. In this form it can be easily handled, or shipped to any point. In making news paper, manila or book paper, this chemical pulp is re-dissolved and mixed with the proper proportion of ground wood pulp, according to the quality of paper to be made. In the common newspaper stock, there is but a small proportion of chemical fiber. In book or magazine paper, a large per cent of chemical fiber is used. The more chemical fiber used, the stronger and whiter the paper will be.

Some of the finest book and magazine paper in the world is made in Maine, and the output is confined to three plants. The Poland Paper Company at Mechanic Falls, produce 25 tons daily, and S. D. Warren and Company, at their plant in Cumberland Mills, produce 60 tons daily, and at their mill in Gardiner they make 16 tons daily, making the total daily output of book and magazine paper in the State 101 tons.

The process of making soda fiber does not differ essentially from that of making sulphite fiber, the liquor or acid only, being made in a different way, soda being used instead of sulphur.

Paper was first made by hand, but the invention of the paper machine in 1798 gave a new impetus to the industry. The first paper machine used in the United States was started in 1820 by Messrs. T. Gilpin & Company, on the Brandywine. Since that time, making paper by machines has become one of the largest and most important industries in the country. The favorite paper machine seems to be the Fourdrinier, of which there are many in this State. The largest paper machine at present in Maine is in the paper mill at Rumford Falls, which makes paper 162 inches in width. It took thirty freight cars to transport this machine. It is within the memory of many that pulp and paper begun to be made from wood. At first it was supposed that poplar wood was the most valuable for this purpose, but in recent years it has been found that spruce makes a stronger fiber, and to-day spruce is recognized as the staple wood for the production of pulp. Such being the case, it becomes of paramount importance to every citizen of our State, to know whether the supply of spruce wood for the production of pulp and the man-

ufacture of lumber is to be permanent, or whether the rapid increase of the pulp and paper industry threatens the destruction and final extinction of this most valuable tree of our forests. In other words, are we killing the goose that lays the golden egg?

The advantages to Maine in converting all her spare timber into pulp wood, are steady and remunerative employment all the year round for the workmen engaged in this industry. In the manufacture of lumber the average amount paid for labor is about $1.50 per thousand feet, while the average amount paid for labor for converting one thousand feet of logs into pulp and paper is about $9.00, a difference in favor of the pulp and paper industry of $7.50 per thousand feet.

In the manufacture of pulp and paper, labor is employed the year round day and night; while in the manufacture of lumber, the saw mill would not average more than six months' employment in the year.

The saw mill is a necessity. It is the handmaid of progress, and without it all building operations would cease. But the benefits conferred by the pulp and paper industry on the people of the State are not yet fully understood and appreciated. Fully 50 per cent of the logs used by the pulp mills are logs that could not be economically used in the manufacture of lumber, and the majority of them would be left in the woods by the lumberman on this account and would remain there to die and rot, were it not for the pulp mill. The logs referred to are crooked and seamy logs. Another advantage to the State in the pulp mill is that every particle of the log that is sound, except the bark, is manufactured, while in the saw mill it is estimated that about 30 per cent of the log is wasted in the slab and in sawdust. In the majority of cases this waste used to be burned to get rid of it, while in the pulp mill even the bark is burned for fuel and there is absolutely no waste.

The above comparison of the two industries is made, not for the purpose of decrying the lumber mill, but in order that the benefits conferred on the wage earner by the pulp and paper industry may be better apprehended; also to bring out the fact that the pulp mill practically wastes no lumber, besides using a vast amount of lumber that otherwise would be almost worthless.

THE FOREST AREA OF MAINE.

Walter Wells, in the "Water Powers of Maine," published in 1869, gives the following areas: Area of the State, 31,500 square miles; approximate area of lakes, ponds and river surfaces, 3,200 square miles; total land surface, 28,300 square miles; total land in farms, 9,000 square miles; in the wilderness state, 19,300 square miles; tilled land in the State, 4,200 square miles; in pastures, wood lots, etc., 4,800 square miles. Counting one-half of the last amount as wood land, and adding it to 19,300, we have about 21,000 square miles of forest in Maine. The above figures were made in 1869, but undoubtedly there is as much land covered with forest to-day in the State as there was in 1869. The tillage area in Aroostook county has been increased since that time, but on the other hand the forest area has increased in many sections. One of the main reasons for the increase of the forest area, is the increased consumption of coal for fuel instead of wood, in all our cities and villages. Another reason is the fact that farmers in many sections have allowed their pasture lands to grow up to woods, because, not keeping the amount of stock they did formerly, they no longer needed so much pasturage. The same might be said of tillage land to some extent. Whatever may be the reason, all observers agree that the forest area of Maine has not decreased within the last twenty or twenty-five years. Of this vast forest area, not far from 15,000 square miles in the northern and northwestern sections, are only to a very limited extent encroached upon by clearings.

"The primeval woods of Maine still cover an extent seven times that of the famous 'Black Forest' of Germany. The states of Connecticut, Rhode Island and Delaware could be lost together in our northern forests and still have a margin of wilderness about each, sufficiently wide to make its exploration without a compass a work of desperate venture."

The last report of the board of State assessors gives the number of acres of wild lands in the State as about 9,700,000 in round numbers. This equals a little more than 15,000 square miles, and it is upon this immense area of wild land that our calculations must mainly be based.

The three pulp and paper plants in the State which use poplar wood only, require a total of about 50,000 cords yearly of that

wood. As poplar is a very rapid growing wood, and as there are large tracts of poplar forest in the State not yet cut over, it is the opinion of those interested that the supply will equal the demand for many years to come, therefore we can dismiss poplar wood from our investigations and conclusions and confine ourselves to the outlook for spruce.

The principal spruce area of the State is a wide belt extending east from the New Hampshire line, taking in the whole plateau of the central portion of the State, where the sources and tributaries of the St. John river system have their origin, flowing north and northeast, and the river systems of the Androscoggin, Kennebec and Penobscot also have their origin, these latter flowing south and southeast. The great Moosehead lake, the Rangeley lakes, Chesuncook lake, Pamedumcook and the Joe Merry lakes, the Schoodic lakes on the New Brunswick border, and Grand lake in Washington county, are all included in this plateau, as are also all the considerable mountains of the State, as Mts. Bigelow, Abraham, Saddleback and Katahdin. The plateau varies in height from 600 feet to 1,200 feet above the sea level. The sources of most of the rivers of Maine lie over a thousand feet above tide water, and in this fact we discover the secret of the magnificent water powers in Maine, some of the finest and most reliable in the world.

The great belt described above, by no means includes all the spruce bearing lands of the State, for spruce is found to some extent in every section, but on the great plateau it attains its fullest vigor and development. One prominent and well-informed timber owner, gives the spruce sections of the State as follows: "The region west of the eighth range, and south as far as ten miles from the most southern point of Moosehead lake." This section would contain about 9,800 square miles, which is about two-thirds of the area of unsettled lands in the State. That there are excellent spruce sections outside the plateau belt is proved by the fact that in getting the data for this article, the scaler for one of the largest land owners in the State furnished an estimate of the number of acres of spruce lands in each of 34 townships, in the extreme northern part of the State, and it was found to be in the aggregate 468,500 acres, or an average of 13,800 acres to a township. It is a perfectly safe and

conservative estimate that the spruce area of Maine exceeds the entire area of the State of Massachusetts.

Another method of estimating the forest area of Maine, is by taking the square miles of forest still remaining in the principal river basins as follows: The total area of the Androscoggin basin in Maine is 2,750 square miles; covered with forest, 1,480 square miles; the total area of the Kennebec basin is 5,800 square miles, of which 3,800 square miles are forest; the Penobscot basin contains 8,200 square miles, of which 5,460 are forest; the St. John basin in Maine, contains 7,400 square miles and nearly the whole of it is covered with forest; the St. Croix basin in Maine contains 800 square miles, of which 640 are forest; the Saco basin in Maine contains 800 square miles, of which one-half is forest. The above forest areas added, aggregate 19,180 square miles, and if we add to this total the forest areas of the smaller river basins we shall have a grand total of about 21,000 square miles of forest in Maine, as we have stated in another place.

Aside from spruce and poplar, there are in the Maine forests white and yellow birch and maple in large quantities, with considerable beech and fir, with scattering areas of bass, brown and white ash, white and red oak, and in the southwestern portion of the State large areas of pine. There are also tracts of hemlock and cedar in the State.

THE AMOUNT OF LUMBER USED.

To make a ton of sulphite pulp, requires about 1,000 feet of logs. For a ton of ground wood pulp about 800 feet of logs are required, so that on the average, about 900 feet of logs are used ordinarily in making one ton of pulp. As there are about 1,048 tons of pulp made daily at present in Maine, the various pulp mills require 943,200 feet of lumber daily, or about 300,000,000 feet yearly. Subtracting from this amount the number of feet of poplar used, we shall have about 275,000,000 feet of spruce lumber used yearly by the pulp and paper industry, and this amount corresponds to the total of the amounts returned on the blanks filled out by the officials of the several mills. The above amount will be increased to about 350,000,000 feet yearly when the plants now building are completed. The lumber mills will

probably require about 250,000,000 feet, so that 600,000,000 feet of spruce lumber will be required annually to supply our saw mills and pulp and paper mills. The lumber and pulp mills of Berlin, N. H., draw part of their logs from Maine forests, but as some mills in Maine obtain part of their logs from New Hampshire and Canada, it is the opinion of manufacturers that these accounts would balance, so that the above estimate of 600,000,000 feet is the approximate yield of Maine forests annually at present.

The questions before us for consideration are: Can the forests of Maine permanently yield annually the above amount of spruce? If not, how many years will it take to exhaust our spruce supply? These are difficult questions to answer, and we can only undertake to present certain facts, and give the opinions of prominent men who have been familiar with Maine forests all their lives.

In Germany, the forests are controlled by the government and forestry has been carried to the highest perfection. Her forests are not allowed to be exhausted, and in fact, many of them are far more valuable than they were forty years ago. It is said that the little duchy of Baden derives an annual revenue of $667,000 from 240,000 acres of forest land. The kingdom of Saxony derives an annual revenue of $1,900,000 from 430,000 acres of spruce land. Many other instances might be given, but it is sufficient to say that in nearly all the countries of Europe, forestry is applied to such an extent that the forest areas are not decreasing, but are becoming more valuable every year. The forest area of the United States, not including Alaska, is less than 500,000,000 acres, and of this area a large portion hardly deserves the name of forest.

The present consumption of wood for all purposes annually in the United States, according to the report of the United States bureau of statistics, amounts to 20,000,000,000 cubic feet. It is estimated that 400,000,000 acres of productive forest must be kept well stocked to yield the above amount permanently, so that any further increase in consumption will require a corresponding increase in forest area, or we shall begin to encroach on our capital, and in fifty years the capital would be nearly or quite exhausted. In Germany, 1,000,000 people are supported by

forestry, and forest cultivation receives as much attention as does field tillage. Training schools have been established for the purpose of developing forest resources, and sylviculture has been most accurately studied, and the economical management of woodland most successfully carried out in that country.

In the United States the whole subject of forest preservation rests with the several states, with the exception of the small area of public lands now owned and controlled by the national government. But few of the states have ever attempted to interfere with forest destruction by private owners, although many of our most learned legal men are of the opinion that, on sanitary and other grounds, legislation, having in view the preservation of our forests, should be enacted.

In this State we have a forest commissioner, and he has done nobly in awakening public sentiment to the importance of preserving our timber lands. Some of the reports emanating from the office of the forest commissioner are invaluable. This may especially be said of the report of 1896, which incorporates the expert opinions and conclusions of Austin Cary, a gentleman who is making the subject of forestry a life study.

VARYING METHODS OF CUTTING LUMBER.

The system of cutting lumber in the woods in Maine is by no means uniform, varying according to the influences brought to bear upon proprietors and operators. In the early days of cutting spruce in Maine, some fifty years ago, only the largest trees were cut, and on the St. John waters no logs less than 15 inches in diameter at the top were thought suitable for the mills. Gradually the limit of fifty years ago has been diminished, till now 11 inches at the top is the custom in northern Maine. No spruce lumber for manufacture into pulp has ever been cut on the St. John river in Maine. The timber cut on that river has mainly been driven down the river to Fredericton or St. John and manufactured in those places into lumber, which, under treaty arrangements with Great Britian, could be brought into this country again free of duty.

On the Penobscot, Kennebec and Androscoggin rivers, a much closer cut has generally prevailed, and logs down to 8 or even 6 inches at the top have been cut in many cases. This has not

been the case always as there are proprietors of timber lands, who, mindful of the State's future needs, draw their stumpage contracts very rigidly, and many of them will allow no trees less than a foot in diameter breast high to be cut. There have been too many cases where the land has been practically stripped of its spruce growth, with an utter disregard of all future needs.

Another matter that should be spoken of in this connection is that of waste. There is no uniform method of scaling in the State, each section having a method of its own. Without describing the different methods or the results attained by them, as for instance the Maine scale rule, where in many cases the larger quantity of wood actually scales less than the smaller quantity, we can see no objection to the adoption of the method that prevails in Europe, namely, obtaining the simple cubic contents by means of a caliper rule. All that is necessary is to measure length and mid diameter of a log, the figures on the rule giving the cubic contents. For pulp logs this is pre-eminently the best method of scaling, and the ratio of board feet to cubic feet in logs of different sizes could further be had for the convenience of saw mill men.

By the methods of scaling and cutting that prevail in portions of the State, from 25 per cent. to 33⅓ per cent. of the wood is left in the forest as waste, an absolute loss, as well as a menace to the safety of the forest. It is patent to all that the closer to the ground a tree is cut and the more of the top there is saved, the more pulp wood there will be in a log, and if 25 per cent. or more can be saved in this way, the less the number of trees to be felled. There are other methods of waste in the forest, such as the reckless cutting of wide roads, etc., particularly on wood lots where stumpage has been bought, for the buyer of stumpage feels obliged to get out the largest possible quantity of logs in the least possible time and at the least expense to himself, and the higher the cost of stumpage the more urgent the necessity of curtailing his other expenses.

The danger of exhausting the spruce supply rests more among the small owners of wild lands than among the large proprietors. Many of the small owners never saw their lands. Some of them are the children of former owners and they have inherited a tract of timber land which their father owned. This tract must

be divided into as many parts as there are children or heirs. The taxes must be paid on it, and it is but natural that the owners should want to obtain returns from it. A constant pressure is brought to bear upon the party who has the care of it by these heirs, many of whom know nothing about the growth or exhaustion of spruce or any other timber. Of course such owners are willing that their lands should be stripped of timber if only they get present returns. Many townships or parts of townships have been almost entirely stripped of spruce growth on account of the thoughtlessness and cupidity of the small owners. The large owners are not entirely blameless in this respect, but they are generally more careful in drawing their stumpage contracts, or in making their cuttings when they operate on their lands themselves.

HOW FAST DOES SPRUCE GROW?

In discussing the subject of spruce supply for the future, the above question is a pertinent one, and must be taken into consideration. The consensus of the opinions of lumbermen of intelligence and experience, seems to be that spruce is of slow growth. The idea often expressed that spruce lands can be cut over every fifteen or twenty years down to a certain limit, and as much timber obtained as at the first cutting is erroneous.

At the first cutting, usually, only the finest and most available trees would be taken. At the next cutting the operator would have to go farther back, possibly away from the water courses and even up on the sides of the hills, and by so doing he might obtain as large a quantity as at first. But he cannot continue these cuttings with equal results except by going below the limit set at first, and then he begins to exhaust the supply. The limit of the cuttings on the St. John waters have been decreased in this way from 15 inches diameter at the top, to 11 inches.

The late Ex-Governor Daniel F. Davis, who understood forestry, probably, as well as any American has ever understood it, said that it required 250 years to produce a mature spruce tree. Austin Cary says, in the forest commissioner's report for 1896, that it requires from 6 to 8 years for spruce trees, from 6 to 12 inches in diameter, to grow another inch in diameter. From the Forester of March, 1898, a monthly magazine pub-

lished in Washington, we take the following table, showing the rate of growth for ten years of 300 selected spruce trees in Ne-ha-sa-ne park in the State of New York.

Diameter breast high in inches.	Annual growth in inches.	Years required to grow one inch.
9	.1	10
10	.12	8
11	.14	7
12	.12	8
13	.13	8
14	.14	7
15	.11	9
16	.11	9
17	.11	9
18	.11	9
19	.12	8
20	.10	10
21	.11	9
22	.08	12
23	.10	10
24	.10	10
27	.14	7

It is presumed that the trees so selected and measured, had the most favorable conditions as regards light, air and soil. A variation in the conditions produces a corresponding variation in the rapidity of growth. Several pieces of spruce chipped from trees on land of M. G. Shaw, near Moosehead lake, showed great variation in growth. One piece taken from a tree on the side of a mountain where there was an abundance of air and sunlight, had rings nearly a quarter of an inch in thickness, while another piece taken from a tree in the dense woods had rings less than one-eighth of an inch in thickness. Under the most favorable conditions, it probably requires about 6 years for a spruce tree to gain an inch in diameter, and in that case from twenty-five to thirty years should intervene between cuttings, where trees have been cut down to 6 inches at the top. The cutting out of the mature trees is a benefit to those left standing, as sunlight is let in and the air has freer circulation. In scientific forestry the young trees are thinned out, the underbrush removed, and every means possible taken to give the growing tree air and sunlight.

WHAT IS THE AMOUNT OF AVAILABLE SPRUCE TO-DAY?

The above is one of the most vital questions that can be asked in the consideration of the subject under discussion, but it is a question that can only be approximately answered with the present data at hand, and, in fact, it may be folly to attempt to present any figures in regard to the subject, but, as many lumbermen in different parts of the State have been interviewed, it may be pleasing to present some of their views.

In the very excellent report of the forest commissioner for 1896, we find an estimate of the quantity of spruce lumber of suitable size for cutting, standing in the Androscoggin valley in Maine in that year. The estimate was about 3,600,000,000 feet on 1,240 square miles. The spruce producing area of the Kennebec valley is about 2,800 square miles, of the Penobscot valley 4,500 square miles, and of the St. John valley in Maine, 5,000 square miles. If we apply the estimates of the Androscoggin spruce bearing section pro rata to these three sections, we shall have the enormous amount of 35,424,000,000 feet of available spruce in the Kennebec, Penobscot and St. John valleys. But this amount should probably be reduced one-third, as the three sections under consideration are not considered equal to the Androscoggin valley in spruce production. Reducing the amount as suggested, and adding the estimated amount of spruce in the Androscoggin valley, we have 27,024,000,000 feet of available spruce in the four great spruce producing valleys of the State. In an address delivered in Boston last May before the Association of Engineering Societies, by Austin Cary, on Forest Management in Maine, he makes the approximate estimate of 25,000,000,000 feet board measure of spruce in Maine forests at the present time. Assuming that the yearly demand from the pulp and lumber mills, will, for many years, be not far from 600,000,000 feet of spruce, it will take a period of more than 40 years to cut over the whole spruce producing section, a period sufficiently long for spruce to grow from 12 inches to 18 inches in diameter breast high. The above estimates may be too optimistic in regard to the present and future supply of spruce, but in the opinion of many lumber operators of sound judgment, they are considered as safely conservative.

One experienced lumber operator who was interviewed on the subject of spruce supply, suggested that it would be a conservative estimate to assume that on an average there is at present in the State 1,000 feet of available spruce for every acre of forest land. On this supposition, there would be at the present time 13,500,000,000 feet of spruce suitable to be cut for lumber as pulp. In this case it would take about 22 years to cut over the spruce area, which period would be hardly long enough for the trees left to attain the requisite size. Possibly the true estimate lies somewhere between these two extremes, and in that case we can come to the conclusion that there is no present cause for alarm in regard to exhausting the spruce supply, unless the wasteful methods of cutting that have prevailed in the past shall be continued. In the forest commissioner's report of 1896 Austin Cary says, "Taking the State as a whole, I doubt if the yearly production of spruce is yet overcut. Assuming the yearly cut as 600,000,000 feet board measure, that amounts to only 30 feet growth per acre on the gross area of the State, or perhaps 60 feet on what is actually spruce-bearing land." The above is what Austin Cary said in 1896. The actual growth per acre on much of the spruce bearing land is 100 feet. We can perhaps safely assume that the yearly growth will average 50 feet for every acre of forest land. That would give a little more than 600,000,000 feet yearly, and it is the opinion of intelligent manufacturers and operators that this source of prosperity and wealth can be maintained permanently.

There are many dangers, however, some of which we have indicated. The reckless and unnecessary waste in leaving so much of the tree in the woods should cease at once, more care should be taken in yarding the logs and in hauling them to the streams or railroads, and all unnecessary destruction of small trees should be avoided. Timber land owners should draw their contracts for selling stumpage most rigidly, and insist on the carrying out of the terms, faithfully. If a broad-minded policy is adopted by timber owners, and a due regard for the future prosperity and welfare of the State shall prevail among them, the forest area of the State will be made to yield a perpetual annual revenue.

FORESTRY METHODS ADOPTED.

So far as the preservation of the timber land is concerned, it would be better to have them in the possession of a few large companies or syndicates. The danger of exhausting the spruce supply does not come from the large owners, usually, as we have shown elsewhere. The great pulp and paper companies are not a menace to the spruce of our State. A plant for the manufacture of pulp or paper or both is a costly affair, the expense often running into the millions of dollars, like the immense plants at Rumford Falls, Chisholm, Madison, Cumberland Mills and Millinockett. As a general thing, the pulp and paper companies have 90 per cent of capital invested in their plants and about 10 per cent in their timber lands. The reverse might generally be said of lumber manufacturers. Pulp and paper manufacturers are looking for a permanent supply of raw material for their costly plants. They cannot afford to do otherwise. Hence the International Paper Company has adopted a rule to cut no trees less than a foot in diameter, breast high, on its 300,000 acres of land in Maine.

The great Northern Paper Company has adopted a similar rule on their 250,000 acres of timber lands in the State, and other companies have similar rules. Many large companies keep a skilled forester on their lands all the time. The days of indiscriminate and reckless cutting have gone, and intelligent forestry methods are being adopted by nearly all extensive proprietors.

There are some other things to be taken into consideration that have a bearing on the problem of spruce supply. Railroads in these latter days have so annihilated distance that logs are transported in some cases three hundred and even four hundred miles. There are almost inexhaustible quantities of spruce timber in Canada, and only a few pulp and paper mills there. There is no duty on logs, and we have two of the great Canadian roads running into this State. Some of our mills already procure their logs from Canada, as we have already shown, and in the future this will be the case more than it has been in the past. The waste of the saw mills, that used to be burned to get rid of it, now has a commercial value, and is nearly all saved for the pulp mill. The waste of the great Ashland lumber mill is transported

over two hundred miles to the Cushnoc mills in Augusta, to be manufactured into pulp. More southern lumber is brought to this State for building purposes than in former years. Iron enters more and more into the construction of buildings, bridges, etc., and concrete, or artificial stone takes the place of wood, in floors and sidewalks. All these things tend to diminish the demand on our forests for lumber.

The southwestern portion of Maine is essentially a pine bearing region, and pine is being used to considerable extent now in making pulp. Other woods are also utilized more or less for pulp, thus decreasing the demand for spruce.

CONCLUSION.

Maine is a State of almost boundless natural resources. It has the finest granite, slate and lime in the world. These three resources are found within our borders in practically inexhaustible quantities, but the three combined are not so valuable as the spruce in our forests. Three hundred million feet of spruce manufactured into pulp and paper, is worth $17,900,000. The product is almost wholly shipped out of the State and its equivalent returned in money. To this vast sum should be added the value of 250,000,000 feet of spruce manufactured into lumber. This would add several million dollars to the amount, making a revenue of from twenty millions to twenty-five million dollars derived from the annual cut of spruce. This revenue can and should be permanent.

It is the opinion of those best informed in regard to our timber lands, that our forests can furnish 600,000,000 feet of spruce annually for an indefinite period, provided the reckless and destructive methods of cutting shall cease at once. All agree that we have come dangerously near the extreme limit; that any further stripping of timber lands will be similar to the encroachment on his principal by a man who has just money enough invested to produce a comfortable and permanent income.

There is no problem before the people of Maine that compares in importance with the problem of forest preservation. It means permanent employment for thousands of wage earners. It

means comfortable homes for the wives and children of these laborers. It means civilization, progress, prosperity and happiness. It means the preservation of our magnificent water powers, for our rivers depend on the preservation of forests to maintain their life and volume.

Other industries, such as the cotton industry, the woolen industry and all industries that depend on water for their motive power, are interested in this problem. Many of the electric plants which light our towns and cities, and also furnish electricity to propel electric cars on street railroads, are run by water power. These all have an interest in the preservation of the means by which water is stored up and prevented from yielding its energy back into the atmosphere by evaporation. Hundreds of sportsmen resort to our forests every fall, but the deer, moose and caribou would disappear with the disappearance of the forest, and this source of revenue would be lost to our people.

The ramifications of the various interests involved in the preservation of our forests are almost numberless, and it may be said that directly or indirectly all our people are interested.

It may be questioned whether any attempt to restrict the cutting of spruce to a certain size in our forests should be made by legislation, or whether the end should be attained by an understanding between manufacturers and land owners, but that indiscriminate and destructive cutting should cease, no one will deny. The people are awakening to the importance of this subject as never before, and many owners of lands are patriotic enough and far-seeing enough to individually apply the remedy as far as they are concerned.

We stand second, among the forty-five states composing this mighty country to-day, in the production of pulp and paper, and shall soon undoubtedly stand first on the list. That supremacy we can hold by adopting wise methods, or we can lose it and lose the great industry altogether, by continuing the wasteful methods of the past.

Within the period of one generation, the State of Maine has advanced from obscurity in industrial matters, to be one of the most important manufacturing states in the Union. Yet the State's resources are only partially developed. Our immense water powers are not one-tenth part utilized. We cannot

exhaust our quarries of granite; we cannot exhaust our stores of slate; we cannot exhaust our deposits of lime; the tons of ice that we cut from our rivers and lakes every winter and send south every summer, produces no exhaustion; the sea furnishes as many fish to our eastern towns and cities for canning purposes to-day, as it did thirty years ago; the soil of our State is only made richer and more productive by cultivation; the more apples, hay, grain and potatoes we raise, the more we can raise in following years. Among all our industries, there is only one that is in danger on account of exhausting the raw material by which it lives and thrives, yet that industry is the imperial industry of Maine, as valuable as many of the others combined. But that industry can be made permanent by adopting wise measures, and can be made the most important factor in advancing and maintaining the Pine Tree State to the proud position that was revealed to the prophetic vision of the founders of our commonwealth, when they adopted as our motto, the word, "Dirigo," I lead.

THE LUMBER INDUSTRY.

The lumber industry of the State of Maine is so extensive and complex, that definite data in regard to its many branches can be obtained only at very large expense. The means at the disposal of the Bureau have allowed merely a cursory examination of the present aspect of the industry. Even this has been greatly hampered by failure of various operators to reply to questions sent them by letter, and the impossibility of obtaining interviews with many who could give valuable information.

For reasons stated above, the following article must stand as simply a partial account of the progress of an industry which, perhaps, more than any other, has been important to Maine's industrial growth.

Throughout the greater part of the present century, many of the business men of Maine have been engaged in the production of lumber in one form or another. The vast timber lands which have covered the extensive area of the State have proved of inestimable value, undoubtedly producing more wealth than any other of the resources of Maine, and at the same time giving employment and furnishing a livelihood to a large percentage of its population.

In the early days of the lumber industry, the production consisted largely of long lumber, clapboards and shingles, other short products being manufactured only in comparatively small quantities. The former conditions have greatly changed and although, perhaps, as large a quantity of long lumber is produced as formerly, the scope of the industry has broadened with the advent of various allied industries. The manufacture of railroad ties, telegraph poles, sashes, doors, blinds, boxes, finish, mouldings, flooring and hard-wood products of endless variety,

properly come under this subject, but can be no more than mentioned in this article.

In the past few years, an inter-relation which should be noticed, has sprung up between the lumber and pulp industries, the sulphite pulp mills using, besides large quantities of logs, cut specially for them, a great part of the waste slabs and edgings from some of the lumber mills. Spruce is most largely used in pulp manufacture, and, since the pulp mills have grown up so rapidly in Maine, the value of spruce timberlands has probably doubled.

Another branch of the lumber industry which has assumed extensive proportions, is the spool bar industry which utilizes great quantities of white birch. A large part of the thread factories in the United States, and more than half those in Great Britain, obtain their spool stock from Maine. It has been estimated that from 35,000,000 to 40,000,000 board feet of white birch are annually cut in Maine, over 15,000,000 feet being manufactured into spools within the State.

Not since 1873, has there been evident so much activity in lumbering circles as during the present season of 1899, which will prove one of the banner years in the history of the State, being exceeded only by 1873 and 1890. The lumber boom has had very beneficial results on every side, carrying with it employment and prosperity to many of the owners of coasting vessels which transport the product to market. However, for the majority of operators and mill owners, the season has been highly successful, both in financial returns and amount of shipment.

The records of the surveyor-general in Bangor, show that the amount of lumber surveyed on the Penobscot in August, 1899, was the largest for that month, in the history of the industry. The figures show that over 31,000,000 feet of lumber were surveyed, as compared with about 17,000,000 feet in August, 1898. The total survey of the year up to October 1, was 137,323,902 feet against 102,593,769 feet in 1898. From January 1 to December 1 there was surveyed 174,012,809 feet of lumber of all kinds, and it is estimated that the survey for the month of December will add 4,000,000 feet to this amount, making the grand total for the year 178,012,809 feet which is the largest survey, with the exception of that of 1890 since 1873. The excess over 1898 is nearly 34,000,000 feet.

Of the lumber surveyed this year about 133,000,000 feet has been shipped from Bangor in sailing vessels to domestic ports; 455,000 in sailing vessels to foreign ports and 7,000,000 in steamers to foreign ports.

The remainder has been shipped by rail to Boston, New York and elsewhere in the eastern part of the United States. Besides the great increase in the volume of business done there also has been a surprising rise in prices. Logs that sold last year from $9 to $11 per thousand brought $11.50 to $14.50 this year, while spruce lumber that sold in 1898 at $11.50 to $14.50 has been in great demand at $15 to $22. There are few logs and little lumber left here to winter. An army of men is now in the woods, and all over the State the log cut will be immense.

What is true in the Penobscot region, of brisk business and activity during the year, has been true in all parts of the State, mill owners having experienced a season of great prosperity. The demand for all kinds of lumber has been great, and the usual falling off in the market for July and August has been conspicuous by its absence. Old operators say that, following the War of the Rebellion, the call for lumber was unprecedented up to about 1874. The boom year was in 1872, when many deals were shipped to Europe, the totals for the year, in the State, being the largest ever known. An immense business was done by all the mills, which were more numerous than at the present time, but prices were lower than now, and several heavy failures are reported to have followed the extensive operations of that year.

The greatest call at the present time is for spruce lumber. As stated elsewhere, the advent of the pulp and paper industries has greatly increased the demand for this commodity. Hemlock has disappeared in large quantity from operations, as the logs of this kind are very scarce. Pine, which once held so prominent a place, and although still manufactured in large quantities, has apparently yielded its former place to spruce.

The records of the surveyor general, of the production on the Penobscot river, give the cut as far back as 1831, when the total was 37,556,093. From 1832 to 1850, mostly pine was cut, but the exact figures cannot be ascertained as the records previous to 1851 show only the totals. The records of the Penobscot cut from 1832 to December 1, 1899, are given below:

	Pine.	Spruce.	Hemlock, etc.	Total.
1832	–	–	–	37,556,093
1833	–	–	–	44,000,845
1834	–	–	–	30,756,558
1835	–	–	–	67,431,699
1836	–	–	–	50,841,756
1837	–	–	–	61,976,832
1838	–	–	–	74,020,409
1839	–	–	–	90,767,789
1840	–	–	–	70,717,421
1841	–	–	–	82,336,639
1842	–	–	–	112,341,566
1843	–	–	–	120,137,126
1844	–	–	–	116,788,121
1845	–	–	–	154,884,849
1846	–	–	–	140,084,864
1847	–	–	–	191,136,272
1848	–	–	–	213,051,235
1849	–	–	–	160,418,808
1850	–	–	–	203,754,201
1851	143,586,200	47,567,682	10,851,948	202,005,830
1852	124,399,736	63,859,929	11,129,757	199,389,422
1853	92,484,711	78,087,096	12,370,477	182,942,284
1854	93,446,799	53,564,196	12,580,342	159,591,337
1855	123,026,157	78,337,283	10,305,753	211,669,193
1856	102,411,667	66,526,983	11,323,580	180,262,230
1857	75,816,045	56,735,284	12,557,680	145,109,009
1858	68,453,844	62,045,696	16,166,907	147,666,447
1859	84,704,700	78,066,187	15,275,553	178,046,440
1860	98,401,676	88,285,040	14,662,811	201,349,527
1861	48,238,957	72,928,910	9,874,824	131,042,691
1862	61,725,787	90,865,804	7,471,392	160,062,983
1863	63,544,438	110,304,467	16,323,364	190,672,269
1864	54,846,506	106,774,936	12,814,830	174,436,272
1865	48,296,222	107,505,867	14,078,934	169,881,023
1866	63,575,411	154,971,243	19,000,952	237,547,606
1867	51,207,174	139,445,478	15,830,706	206,483,358
1868	50,309,399	152,931,455	17,553,912	220,794,766
1869	40,980,911	133,756,757	16,103,240	190,840,908
1870	30,030,000	149,103,192	22,881,000	202,014,192
1871	42,383,000	163,121,675	21,987,000	227,491,675
1872	46,150,000	176,933,649	23,370,000	246,453,649
1873	32,586,848	129,277,908	17,337,592	179,202,348
1874	24,178,309	135,226,015	17,382,608	176,786,932
1875	22,335,849	116,664,487	15,662,793	154,663,129
1876	19,615,572	82,087,987	13,417,632	115,121,191
1877	14,704,152	85,480,149	17,683,444	117,867,745
1878	19,479,497	81,358,056	21,302,775	122,140,328
1879	17,959,415	91,907,627	12,695,220	122,562,262
1880	17,668,651	91,573,149	14,208,737	123,450,537
1881	33,732,101	104,704,537	15,912,159	154,348,797
1882	33,408,035	122,548,230	16,154,829	172,111,094
1883	26,522,485	115,348,484	19,392,223	161,263,192
1884	24,718,767	84,425,303	16,169,276	125,313,346
1885	30,480,937	94,446,522	17,867,104	142,794,563
1886	28,603,783	100,905,443	17,055,420	146,564,646
1887	29,108,725	102,746,234	17,792,578	149,647,537
1888	30,942,687	114,348,153	19,473,695	164,764,535
1889	27,885,394	121,659,086	20,665,903	170,210,383
1890	28,255,236	129,541,485	21,310,006	179,106,727
1891	23,114,771	118,205,741	23,664,844	164,985,356
1892	26,886,302	105,044,377	28,453,079	160,383,758
1893	22,425,874	81,400,612	25,447,931	129,274,517
1894	25,369,893	116,969,664	18,934,467	161,274,024
1895	27,189,050	91,488,448	25,513,996	144,191,494
1896	23,229,739	90,449,002	24,270,204	137,949,005
1897	25,935,354	118,007,612	25,817,117	169,760,083
1898	22,501,025	95,167,159	26,656,559	144,324,743
1899 to Dec. 1	17,348,763	99,963,824	20,011,435	*174,012,809

* To which adding estimate for rest of the year, makes 178,012,809.

The above figures show very plainly the conditions on the Penobscot, and the marked increase in the last thirty years of the cut of spruce over that of pine and other woods. The large demand for spruce has been the same in all localities in the State.

The total cut of all kinds of lumber for the past year on the Kennebec, was about 110,000,000 feet, the Penobscot cut will amount to nearly 180,000,000 feet, and that in other localities will swell the aggregate to about 600,000,000 feet.

The methods of carrying on the operations attendant on the production of lumber, have seen great modifications in the past few years. The introduction of improved machinery has facilitated and reduced the expense of the lumber manufacture, perhaps, as largely as in any industry. For a better comprehension of present methods, a comparison of the conditions of to-day with those of the past are essential. The fundamental operation of lumber production, is the cutting of trees in the forests and their transportation to the base of manufacture. In the treatment of the subject, that of logging has been first taken up.

CUTTING AND HAULING.

Logging is carried on during about twenty or twenty-six weeks in the year, the time varying with the amount to be cut. Formerly no cutting was begun until the snow began to come, but now the choppers begin early in the fall, so that the trees may be down and yarded when there is sufficient snow for sledding to start them to the landings.

The operations for the season of 1899-1900, promise to be particularly active in all localities, owing to the immense demand for lumber, and the cut may exceed that of any previous season, as both lumber and pulp mills, next year, will require a large quantity of logs. A well-known lumberman says, that each season's cut must of necessity be larger than that of the year previous, as each succeeding season imposes heavier expense upon the operator. Each spring he has to drive new streams and seek new fields further back into the wilds that have not felt the blows of the woodsman's axe. This means longer roads, which in turn demand more horses to haul the logs and also larger crews. Wages for the winter have increased so that the men will be better paid than for many years. Operations in Canada

have taken many men from the State, and Maine lumbermen have been obliged to look sharply for their help. The increase in lumber prices which has been spoken of, will not, perhaps, help the operators in the woods, as the timberland owners have so increased their rates for stumpage as to make, with the advance in wages, the operator's margin, when the logs are sold, about the same as formerly.

As typical of the progressive Maine lumbering firm, a prominent Bangor firm has been selected, and an outline of its methods may serve to explain the manner in which logging in the State is done at the present time. Early in August, a crew of about twenty men left Bangor on their way to Moosehead lake, north of which the operations are to be carried on. Following the first crew after a few days, a few more men, this time with a number of horses, also proceeded to the same place, the horses hauling wagons loaded with chains, ropes and other equipments for the winter's work. On reaching the Northeast Carry at the head of the lake, to which point they have been transported by steamer, the start was made over rough tote roads to the camps forty miles into the forest. The men walked and carried their packs. The horses drew the freight on vehicles adapted to stand the rough passage. Other men and teams went over the same route at various intervals of time, and about the middle of September the camps were in operation with about one hundred and fifty men and a third as many horses employed. If the number of men and horses be multiplied, say by about twenty, the scale upon which lumbering on the upper Penobscot waters is carried on yearly may be imagined.

When the crews of men and horses have arrived at the camps, the trees begin to fall by the axes of the choppers, and the yards and roadways are cleared and leveled by the so-called "swampers." The felled trees, which consist mostly of spruce, pine and cedar, are hauled by teamsters on sleds and yarded in great piles, being laid in tiers lengthwise and held in place by skids, a horse by means of tackle hauling the logs into place on the upper tiers. By the last of January, it is usual that the greater part of the chopping is completed and the choppers leave the woods. But the hauling of the logs to the landings must then be completed and the supplies for the next season stored. This work is fin-

ished by the first of April, and the crews leave the woods. When the ice goes out, the driving crews are at the landings ready to roll the logs into the streams and drive them on the high water to the booms below.

When the logs of one season are cut and landed on the rollways by the end of March, ready to be put into the river and driven to their destination, certain supplies of provisions for the next season, and hay and grain for the horses, have been hauled to the camps and stored. These commodities are hauled to the camps over the rough wood's roads by tote teams which are often operated by contractors who transport all needed supplies at a certain price per ton. The books of one lumberman for last season show that his supplies were carried about fifty miles through the woods by a firm employing several men and eighteen horses, at the rate of eleven dollars per ton. When it is considered that the supplies for the camps of many firms amounted each to about one hundred tons, an idea may be had of the extent to which the toting business alone, reaches. During the spring and summer months the storage places of the next season's supplies, are watched over by trustworthy caretakers.

Great improvement has been made in the past few years in the fare in logging camps, to the staples, such as bread, beans, salt pork, molasses and tea, which were mostly relied upon not long ago, being added fresh meats, vegetables, dried fruits and other foods of excellent quality. The cooking to-day, is done by experienced men, with modern ranges, instead of over the open fires of earlier days. The men still live in the camp of logs, and at night sleep side by side on the long bunks which are covered with boughs.

Much of the history of logging may be had from old lumbermen. One veteran, speaking of the changes of the past forty years, said:

"When I first went to work in the woods, fifty years ago, only oxen were used for hauling. No one thought of beginning the winter's work until the snows had fallen so that supplies could be sledded into the woods. For hauling logs, a team of from four to eight oxen was yoked to a bob-sled, a short sled with a single bar, upon which was placed a heavy timber call a bunk

which served to strengthen the bar and prevent its being worn out. On this bunk one end of the logs was placed to which they were securely chained, the other end dragging, so the team pulled the load along by sheer strength. Then the logs before loading had to be barked, that is, the bark hewed off from one side so as to present a smoother surface on the under side as they were dragged along the road-bed, which of course consumed a great deal of time, but this is all done away with by the use of wagon sleds.

There was no yarding of logs such as is done to-day, and they were mostly hauled directly from where they were cut to the landing. To load the sled for each trip to the landing, the oxen had to be taken from the pole and made to drag the logs upon the sled. You have seen oxen under the yoke and know how deliberately they move. You can judge then, how slow a process the loading and hauling of logs was, when we depended on them. The sleds and yokes we made after arriving at the camps, the sleds without an atom of iron in them except the clevis pin at the end of the tongue, the yokes entirely of wood. The yoke bows were brought into the woods, hung to the necks of the oxen, and to make the yokes we hunted up crooked birch trees with the right bends in the trunks, and hewed and shaved them into shape. With the pair of horses and wagon-sled in use to-day, a man can do as much work as one could do then with a bob-sled and eight oxen. The difference in expense in favor of the new way, is a great item in the profits of getting out lumber. The men move more quickly and do more work all along the line now, than they did when oxen were used, for the slow-moving beasts set the pace for the whole procession.

"Men who work in the woods are better fed and better paid now, than when I began the business, and up to the time of the Civil War, when all wages were raised. Then the swampers got ten or twelve dollars a month, and the highest wages paid to any of the men was twenty dollars, while the head man's pay ranged from twenty-five to forty dollars. Now the swampers receive from twelve to fifteen dollars a month, the choppers, teamsters and sled-tenders from twenty to twenty-six dollars, and the head man's pay ranges from thirty to sixty dollars. The cook gets from thirty to forty dollars, while the cookee gets only

ten or twelve dollars a month. In the old days we cut nothing but pine timber. We were working in the first growth, and some of the great pumpkin pine trees that we felled yielded logs that would square three feet."

DRIVING.

The methods of log driving have been variously modified from time to time, all modifications being in the way of improving facilities. Besides the logs which are driven by individual firms, employing from ten to three hundred men each, a large amount of driving is controlled by the log driving companies, who are making every effort to better adapt the water courses to the easy movement of logs. Dams have been so placed as to control, to an extent, the supply of water for the drive, and gain of water power is also being sought after by the removal of obstructions in the beds of the rivers, such as boulders, islands and sand bars.

On the upper Kennebec, a large amount of this work has been done during the past season. The work was commenced during the early fall when a most unusual task was laid out. There were at certain points all along the river obstructions that were a menace to the river driving companies. Hardly a driving season was passed through that did not see one or more large jams formed in some place after the logs had entered the river. In order to remove these jams it was necessary for the gates at Moosehead lake to be raised, and by means of the large quantities of water thus allowed to flow away, clear up the obstructions further down the river.

This method has been in use for years, and until the water power attained its present importance but little damage was felt by the industries further down. Later, when the water power began to develop, the importance of saving this water that was wasted was felt by the manufacturing companies.

The changes have now been completed. At the dam at Moosehead lake new gates have been put in and the log way narrowed down from 44 to 25 feet. In addition a sluiceway has been put in, through which it will be possible to control the water.

In addition, Turtle island, which contained more than a surface acre of ground and which in places was thickly wooded, has been blotted off the face of the map. This was one of the worst places on the river, and, last year, a jam of 10,000,000 feet was there formed. The removal was at a great expense to the log driving companies. In addition a large number of boulders have been blown out of the river, and at places where the rocks made frequent jams, blasting has been done, so that even with the obstructions alone removed, there would be a great saving of water, from the fact that fewer jams will be formed. In addition, the dam at Moosehead has been repaired, so that the saving will be so great that manufacturers along the river do not anticipate any trouble, next year, on account of low water.

The obstructions in the river have been removed at a cost of about $3,000. The repairs at the dam cost between $2,000 and $3,000 more. The expense of making the repairs is borne equally by the Log Driving Company and the Kennebec Water Power Company. Plans have been made for making further improvements in the river, but whether or not this work will be done, next year, has not been decided.

Elaborate plans are on foot for not only bettering the condition on the Kennebec, but on the other water ways, the supply of which is partly governed by the gates at the different lakes which are made to serve as great reservoirs.

As the logs of individual operators are driven out of small streams into the main rivers or their larger branches, they become intermingled with the logs of other drives from neighboring streams, so that it is impossible for each individual operator to make a separate drive to the boom. For this reason the log driving companies are formed to take charge of all the logs which come into the waters which they control. Often several drives are made on the same river during the spring and early summer, in order to promptly care for both the early and later logs, for there is a great difference in the time when the individual drives are turned into the main streams or rivers. When the logs are all driven into the main boom, the expenses incurred by the log driving companies are figured and each owner whose logs are included in the "corporation" drive is assessed in proportion to the amount of lumber he owns.

By the time the ice has started from the different streams and lakes, the drivers are on hand to drive the logs to the booms where they are to be collected before being distributed to the various owners. The ownership of each log is designated by a mark or signature, so that when the time comes they can be easily separated. If the drive is to be started on streams, the logs which have been hauled to the banks are rolled into the water and started on their way. The work on the lakes differs from that on the streams in that, in the winter, the logs are hauled directly on to the ice, and when they are all in their place a large boom is constructed so as entirely to enclose the logs, thus making an immense raft. Where practicable, these rafts or booms are towed to the outlets by steamers, which work during the spring gives profitable employment to the same lake craft, that are kept busy in the fall transporting hundreds of woodsmen and thousands of tons of supplies and provisions to the carries, which are the gateways to the fields of operation. On Moosehead lake alone, during the season just past, the cut of the region, amounting probably to about seventy-five million feet, was towed in the manner described; the steamer "Moosehead" taking across the lake one raft containing three million feet, and covering six acres of the lake's surface.

When logs in rafts, or enclosed in the booms, have reached the outlet, the boom is fastened, and is broken at the proper place, so that the logs may immediately enter the river and start on their journey to the booms below. The object of the drivers, who are athletic men, receiving on an average about two dollars a day, is to keep the logs moving. They accompany the drive in bateaux, and with cantdogs and pick-poles, assist the progress of the logs. In live water, cantdogs are mostly used to free the logs from any obstructions with which they may come in contact, but in dead water, pick-poles must be resorted to, to push the logs again into rapid current.

Driving employs a large number of men, for the comparatively short time which the work requires. Reports which were received from three log driving companies, show that for an average time, for the three, of about eight weeks, above two hundred and eighty men were employed, who received wages amounting to $30,232.48. Letters of inquiry were sent to the

contractors employed by other companies, but no data were obtained from them. The east branch drive on the Penobscot, of about nine million feet, utilized the services of some one hundred men.

During the time in which the logs are being borne along on the high water, the drivers live by the shores of the rivers, tents being set up for their comfort during the night. A force of cooks accompanies the party, and the men are as well provided for nowadays, while on the drive, as are the employes at the logging camps. Both better tents and choicer fare than in early times, are furnished. The logs of the various drives are brought together into large booms, from which, in turn, they are distributed to the various owners and manufacturers, which distribution requires additional rafting and driving to the proper destinations.

MANUFACTURE.

In no branch of the lumber industry, has so great advancement been made, as in the processes of manufacture, and these changes have largely come about with the invention and introduction of improved machinery.

In early days, sawing, which is the principal operation of lumber manufacture, was done with the so-called up and down saw, with which, perhaps, ten good logs were sawed in a day. In the best Maine mills of the present, band saws are used almost exclusively in the production of long lumber, although the gang and rotary machines are still retained in many excellent plants. These machines, however, have not been neglected in the matter of improvements, and their work where employed is much more efficient than formerly. One change in the gang which proves valuable from an economic standpoint, is the use of thin saws, which diminishes the scarf and consequent waste in sawing, by a considerable amount.

An enumeration or description of the various machines used in the lumber mill to-day, for the production of both long and short lumber, would present numerous difficulties, and is not essential to the requirements of this article. Only a few of the particularly striking innovations, will be mentioned.

The motive power used in the mills, differs materially, according to their location. The rivers of Maine furnish unsurpassed

water power, when at their proper height. Much inconvenience, however, has been occasioned during the present season, by the long August drouth, which so lowered the water that many of the purely water power mills, were obliged to shut down for a number of weeks.

Many fine mills, particularly on tide water, or navigable portions of waterways, which may not be obstructed by dams, are run by steam. The advocates of steam, as a motive power, speak highly in its favor. The furnaces can be furnished automatically with sawdust fuel, most of the mills producing more than enough of this commodity to supply their fires constantly. Under ordinary circumstances, steam power is unfailing and can be adapted to all requirements of the mill, and, with many of the labor saving mechanisms, can be made to perform the work of many men.

A striking manifestation of the application of steam to labor saving machinery, is in the steam "nigger," which is to be found in many of the prominent mills. The nigger consists of an iron arm, actuated by two steam cylinders, and it can be operated at various angles by the unequal application of pressure in the cylinders. By this means, the logs which roll down from the roadway to band saw carriages, are tossed and turned and placed upon the carriages, with almost human intelligence. In one mill which was visited, the niggers in use do the work, which, before their introduction into the mill, was done by five men. There seems to be a diversity of opinion among mill operators, as to the advantages of the nigger. Many speak in the highest terms of its practicability, and others still prefer to have the handling of logs done by hand.

A recent innovation in certain mills in the State, has been the application of compressed air, in such operations as hauling logs into the mill, raising saws, driving band saw carriages, etc. In the mills in which this power has been tried, it has proved satisfactory and inexpensive. The compressing engine can be propelled by water power, and the air, stored in a suitable reservoir, is ready when wanted, by mere opening of valves, which is accomplished in various ways, perhaps most frequently by levers.

In some mills a trial of electricity as a power has been made, but, as yet, it has proved expensive and not entirely efficient.

Illustrative of the advantages from the use of improved machinery, may be noted the immense product of some of the larger mills, where, with a skilled crew and one band saw have sometimes, in a day, been sawed upwards of 100,000 feet of long lumber. As will be seen below, the product of the Ashland mill for the present year, has averaged about 125,000 feet daily, and in the same region, forty years ago, ten logs constituted a good day's sawing. Of course, the number of men employed now is many times greater than at that time, but this increase in numbers may be attributed to improved facilities.

The product from the mills, which is not used in this State, is shipped both by rail and water, to Massachusetts and New York markets. The great quantity of lumber to be shipped, and the scarcity of vessels, resulted, during the present season, in a material increase in freight rates. The revenues from lumber schooners, have thus been greater this year than for a long time past, and the owners, next to the lumber dealers, have been enjoying the generous financial result of the boom in lumber.

There is a very marked difference in the grade of material required by the two markets mentioned above. The former desires only the best and clearest pieces, but the dealers in New York are able to dispose of good but less carefully selected lumber.

The processes of manufacture may be brought more clearly to mind, by an account of the work done at certain mills in the State, which have been chosen as representatives of Maine's excellent lumber manufacturing plants.

MILL OF THE ASHLAND MANUFACTURING COMPANY.

About two and a half miles northwest of the village of Ashland, is situated the extensive plant of the Ashland Manufacturing Company. The plant was erected in 1896, and consists of a fine mill, with ample yards and appliances for handling the product, and boarding-houses, storehouses, offices and the other buildings necessary for carrying on a large manufacturing business. The track of the Ashland branch of the Bangor and Aroostook Railroad runs to the mill, giving means for shipment, which is made largely to Massachusetts markets.

The mill is equipped throughout with the best of machinery, which is driven by a 1,200 horse power engine, two cylinders giving 600 horse power each. Steam is provided by four large boilers, the fires of which are fed automatically with sawdust. Motive power is transmitted through the mill from the engine by a rope drive, one line of rope in the system being 400 feet in length.

Logs are sent into the mill from the river, on a chain carrier. One man is kept constantly busy in directing the logs onto the carrier. From the roadway, the logs are rolled to either side of the mill by bunters, and are placed by men upon the band saw carriages of which there are two. These carriages are propelled by the "shot gun," which consists of a piston running in a steam fed cylinder of ample proportions. The band saw crews are experts in their work, and have made some large records, note of which may be found below. From the band saws, the lumber passes through the edgers, and, when required, through the planers, one to each saw, and then to the butting machines. The smaller stuff passes through the surfacer instead of the large planers. On either side of the mill are systems of live rolls which extend into the yard on both sides of a spur track, on which stand the railroad cars. The different sections of the yard roll system are designated by letters, and as the lumber is carried out of the mill it is marked, so as to define its proper place in the yard, and is switched from the rolls by a bunter, controlled in a switching room in the mill.

Besides long lumber, are manufactured clapboards and laths in large quantities; about 5,000 clapboards being sawed and planed in the mill daily. There is capacity for sawing 80,000 laths daily. In the first week in August, 1899, the daily product of laths was about 22,000 per day. About 40 cords of short wood was also being sent out, the waste slabs and other material being barked and sold for pulp. Eight barkers constantly run, for removing the bark from such wood.

Connected with the mill, are well equipped filing rooms and appliances for repair of machinery. The mill is provided with the Grinell sprinkler system, which, with one large fire pump and two hydrants, furnishes complete fire protection.

The company employs about the mill 130 men and 12 boys daily. The boys, however, receive men's pay, which ranges from $1.35 to $5.00 per day.

The average amount of long lumber sawed daily, during the season of 1899, has been about 125,000 feet, though many days the product has been far in excess of that amount. The record is given below for the week ending August 5, 1899. The lumber sawed was frame orders and three and four inch random. This sawing was not from picked logs, but the logs were taken as they came. The following is the amount sawed: Band saw, No. 1, 510,376 feet spruce, 6,916 feet pine; band saw, No. 2, 510,993 feet spruce, 8,810 feet pine. Total 1,021,369 feet spruce, 15,726 feet pine. There were sawed 6,488 spruce logs and 116 pine, the daily average being 86,425 feet to a machine.

In the winter time, during the logging season, the company employs from 400 to 600 men, and is making arrangements during the coming winter for 25,000,000 feet of logs, which will be cut within thirty miles of the site of the mill.

STERNS' MILL, EAST HAMPDEN.

The fine establishment of the Sterns' Lumber Company of Bangor, was built at East Hampden in 1893, and is supplied throughout with the most modern steam machinery and labor saving devices.

The logs used at this mill, come down the Penobscot in rafts towed by steam tugs, and are taken into the mill pond at high tide. The gates are opened and closed by the tide. From the pond, the logs are conveyed into the mill over a long inclined plane on a chain carrier, and upon being sawed into proper lengths, are rolled to either side of the mill. With the machinery now in use, it takes only three men to do the work on the bed of the mill, where formerly eight were employed. Two band saws are kept constantly running, and the logs are placed on the carriages by steam niggers, which handle and turn the big logs on the carriages, saving much human labor. In speaking of the nigger, the superintendent of the Sterns' plant, said that many people thought it would not do what was claimed for it. "But," he continued, "it never gets tired and does its work just as well late at night as when the mill begins sawing in the morning."

The carriages are run by steam feed, the cylinders recently put in, being 12 by 20 inches. At the time the mill was visited, about 125,000 feet were being sawed daily. From the band saws, the lumber is carried through edgers, whence, after being marked, it is taken directly to the extensive wharves, and is loaded on vessels for Boston and New York. Lumber is carried to different points in the yard, by a system of live rolls propelled by an ingenious belting device, which is one of the improvements in belt systems recently introduced into the mill.

Edgings are sawed into four foot lengths, and are sorted as they are carried through the mill. Several thousand laths are sawed daily from available slabs and edgings. Thousands of clapboards are also made, as are also a small number of staves.

Waste strips and small refuse wood are carried through shutes directly into carts to be hauled away to the yard, where they are piled and dried and sold to local wood dealers.

The machinery in the mill is propelled by a 350 horse power steam engine. Sawdust is used for fuel, and is fed continuously and automatically into the fire boxes. Whatever sawdust is not used in this way is sold. The mill employs about one hundred and twenty men for six months in the year.

WILLIAM ENGEL AND COMPANY'S MILL AT ORONO.

Situated on the Stillwater branch near its entrance to the Penobscot at Orono, the mill of William Engel and Company, during an ordinary season, is abundantly supplied with excellent water power, and, in its present condition, is a fine example of the best water power mills.

Within a short time, the plant has been renovated and extensive improvements have been made, the most important of which are the introduction of compressed air as a motive power in some sections of the mill, and a complete new electric lighting system, which enables work to be done night and day when business demands. The demand is an almost constant one at this mill, and two crews of men are thus given employment.

The compressed air machinery was furnished by a Milwaukee, Wis., firm, and its application to the needs of a saw mill is somewhat of an innovation in the mills of the East. However, it is working satisfactorily in the Engel mill, the owners speaking

enthusiastically of its advantages, both as a time and money saver. The air is compressed in the cylinder of a suitable engine which is propelled by a water wheel. The cylinder is kept cool by a system of coils through which cold water is kept constantly flowing, and the compressed air is stored in a tank, the temperature of which is raised to a very high point, due to heavy air pressure.

When the mill was visited, in three minutes after the engine was started, the gauge on the tank showed a pressure of 105 pounds. The tank is provided like a steam boiler, with a safety valve, which allows the escape of an excessive supply of air. The main power of the mill is generated by water wheels, and the use of the compressed air as applied to different machinery, will be briefly noted below.

The chain carrier which hauls the logs into the new part of the mill, is run by compressed air, which also is used in raising the concealed saws when they are needed. The saw in the roadway, which cuts the logs as they come in, is a fine one of the circular type, 66 inches in diameter, and is raised from below the road by a lever which controls the air supply. The mill is provided with one band saw, the carriage of which is run by compressed air. The logs are sawed into lumber of double its required thickness on the band saw, and is split on another machine which serves at the same time as an edger. The product is carried directly to the yard by rolls and is loaded on railroad cars, to be either hauled away to market or to the drying yards, situated some distance from the mill.

In the old part of the mill, sawing is done by a gang. Thin saws are used, and largely graduated lumber is produced with this machine. Besides the long lumber manufactured, a large quantity of clapboards and laths are sawed, and many suitable slabs are made into box boards. The refuse material is sold to a neighboring paper mill, for fuel.

When the mill is run night and day, about 100 men are employed. Water for fire protection and other purposes, is pumped to the different parts of the mill, and the pumps do their work by means of compressed air. As in all up-to-date mills, the Engel mill is provided with its own repair and setting up rooms, where, among interesting contrivances, is the machine by which

the saws are sharpened. The band saw is placed horizontally on two large wheels, and is advanced slowly so that its various teeth shall each in turn come in contact with an emery wheel set at a proper angle. The mechanism is so arranged that only occasional adjustment is necessary, the man in charge of the work being able to absent himself for fifteen minutes at a time.

MILL OF THE BERLIN MILLS COMPANY AT FARMINGDALE.

The saw mill of the Berlin Mills Company at Farmingdale, built in the fall and winter of 1896-'97, is finally equipped with the latest and most improved machinery, no expense being spared by the progressive company to secure anything which will add to their facilities.

The machinery in the mill is propelled by a 300 horse power steam engine. One band saw does the long sawing. The mill is furnished with niggers which have been described elsewhere, and the band saw carriages are run by shot guns. Long lumber is the principal product of the mill, although the daily average of 40,000 laths is not small. During the present season but a small quantity of clapboards and shingles have been sawed. The waste from the mill is sold largely for pulp. Nine hundred and sixteen cords of slabs and waste were disposed of in July alone.

Seventy men are employed daily, and their competency is shown by the fine records they have made. On the 21st of September, 1899, a world's record was established at this mill, when, with the single band saw, 158,601 feet were sawed out in 11 hours. Of this amount 141,561 feet were orders. The lath machines, on the same day, turned out 62,000 laths. The results of this day's work were, of course, far above the average. For the week ending the 25th of July, the average product was 72,243 feet daily, and that for the entire month of July, was 62,926 feet daily.

MILL OF THE M. G. SHAW LUMBER COMPANY AT BATH.

The mill operated by the M. G. Shaw Lumber Company at Bath, was built in 1883. At one time the machinery was run by electricity, but at present steam power is used. The company employs about 80 men, considerable of the work about the mill being let on contract. The contractors employ men as follows: On clapboards, 5 men; laths, 15 men; loading vessels, 4 to 10 men. The mill is provided with one band saw, surfacers, edger, lath, shingle and clapboard machines, etc. The following daily averages will give an idea of the large amount of work accomplished at this mill: long lumber, 50,000 to 65,000 feet; shingles, 12,000 to 20,000; laths, 26,000 to 42,000; clapboards, 3,000; broom handles, 1,500. All lumber is shipped by water to Boston markets. The waste from the sawing, is cut into stove lengths and sold to local wood dealers.

Much more of interest connected with the subject of manufacture, could have been obtained in the numerous mills in the State had means at hand permitted such an investigation. The accounts given will show that the manufacturers are striving to keep abreast of the times, and the tendency seems to be to save time and expense, as everything possible is utilized to add to the financial returns from the operation. This fact is strikingly brought to mind when it is noted that even the waste products are used either as fuel for running the mill or are sold to be made use of in some other manner.

LOGGING STATISTICS.

In connection with this investigation of the lumber industry, quite a large number of blanks were filled out and returned by mail by operators. This being the first attempt by the Bureau to collect data from lumbermen in this way, many did not fully understand the blank in all its details, and, as a result, the larger part of the returns were too defective to be of use in making up a general tabulation from which to draw practical results and conclusions. However, a portion of them were well filled out, and contain reliable information, from which many interesting facts are shown.

The results obtained from the compilation of returns from fourteen lumber operators are here given. Some are small concerns running a single camp, while others are among the largest, running several camps each. The average number of men employed, varies from 20 to 350; the length of the season's operation, from 16 to 30 weeks; the rate of wages, from $5.00 to $6.75 per week; and the amount of wages paid to men, from $2,400 to $57,750. This refers to the woods operation only, the cutting and hauling of the lumber to the landings, and has no reference to the driving of logs or their manufacture.

These fourteen concerns employed on the average, during the logging season of 1898-9, 1,595 men and 682 horses, which would be an average to each concern of 114 men and 49 horses. The average length of time for all the operations was 22 weeks, 2½ days. During this time 60,750,000 feet of lumber were hauled to the landings, which would be an average of 38,088 feet to each man employed, and 178,152 feet to each pair of horses. Dividing this total cut by fourteen, the number of concerns included in the calculation, would give 4,339,286 feet as the average operation. The wages for all, would average $5.47 per week, or $122.62 for the season. The number of weeks of labor here represented is 35,920, and the total wages paid to the workmen amounted to $196,585. The amount paid in wages to men for each 1,000 feet of lumber landed, was $3.23, while the average weekly product of lumber per man, was 1,699 feet, or 283 board feet per day.

It is estimated by competent authority, that the present cut of lumber in the State of Maine will amount to 600,000,000 feet annually. The above mentioned returns cover 60,750,000 feet or a little more than one-tenth of the entire cut of the State. Assuming that the fourteen returns compiled are fairly representative of the whole, the cutting and hauling of 600,000,000 feet of lumber would require the labor of 15,753 men and 6,736 horses, for a period of 134½ working days each year, while the item of men's wages alone would amount to $1,938,000.

CONCLUSIONS.

An examination of the foregoing pages seems to justify the following conclusions:

The lumber industry in Maine has been and still is of large proportions and of vast importance to the welfare of the State.

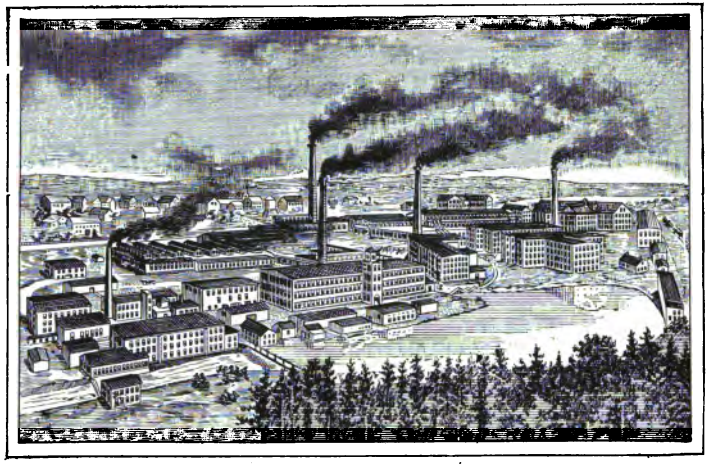
Operators are keeping fully abreast of the age in the various processes involved in the lumber business, as in more economical cutting, improvement of rivers for easier driving, and highly improved methods of manufacture, over those of earlier days.

The outlook for the Maine lumber industry is bright. There has been comment on the danger of destruction of the forests of the State because of the great quantities of lumber required for the various plants, the amount being materially increased by the demands of the pulp mills. It has been stated, that, if the plans of various concerns were to be fully carried out, it would be but a question of a few years before the mill owners would have to look elsewhere for their timber. From conversations with prominent operators and owners it is found that these are regarded as pessimistic views, and that there is cause for no immediate alarm concerning the destruction of our forests. Most of the best and most extensive timberlands are held by large owners who will cut conservatively and not make serious inroads into the forests, in order that the value of their property may be maintained and the supply kept growing for future use.

An element of danger which exists is, that certain lands are held by small owners, who find it difficult to make their business profitable and are obliged to cut immature lumber, without waiting for the fuller development of the trees. Another danger is, that when the stumpage is sold at a high price, the operator is bound to get his lumber out regardless of waste. In this way many small trees are destroyed.

Besides the maintenance of the forests, a full and reliable water supply for the rivers of the State, is essential to the success of all lumbering operations. This supply can be assured only by preserving intact the forest growth around the river sources, thus allowing the moisture which collects from snows and rains to be more evenly distributed throughout the season.

Fortunately, the men prominent in the lumber business of the State, are alive to the importance of maintaining permanent water supplies as well as permanent lumber supplies, and we may still safely look to this great industry as a source of widely disseminated wealth and prosperity.



SANFORD MILLS, ESTABLISHED 1867.

THE SANFORD PLUSH AND WORSTED INDUSTRIES.

The town of Sanford is in the southwestern part of Maine, not far from the New Hampshire line. The Mousam river flows through the town in a southerly direction, dividing it into two nearly equal parts. This river is small, being only about 25 miles in length, but it has probably more water powers in its course than any river of equal length in Maine. There are sixteen powers in the town of Sanford, the aggregate fall being about 200 feet. The two principal powers are at Springvale and Sanford village, the fall at each place being about 15 feet. The greatest power on the river is in the edge of Kennebunk, about eight miles below Sanford. Of this power we shall have occasion to speak later on. There are fourteen ponds connected with the Mousam, aggregating nearly ten square miles in area, all capable of storing several feet of water. The volume of water is very constant and could furnish motive power for a vast number of industries, from Springvale to tidewater, the total fall being 262 feet.

Previous to 1867, Sanford, with the exception of two or three small manufactories at Springvale, was an ordinary farming town. Where now the large village of Sanford stands, there was a saw mill, a woolen mill, a grist mill, a blacksmith shop and one store. Probably not one person then living in the town ever dreamed of the transformation that has taken place.

Thomas Goodall is an Englishman by birth. He came to this country and engaged in the manufacture of woolens, first in Connecticut, then in Massachusetts, and finally in New Hampshire. In Troy, N. H., he manufactured horse blankets for several years, and it was there that he probably conceived the idea of making lap-robes, and a full line of other plush goods.

In 1867 Mr. Goodall came to Sanford and bought out the entire water privilege, mills and all, and proceeded to erect a lap-robe and plush goods manufactory. Previous to 1867, there had never been any plush goods made in this country, and Mr. Goodall perceived an opening for the establishment of a new industry. His foresight and business sagacity have been rewarded a hundred fold, for he has seen the industry, which he started in the loft of the old grist mill, grow to such enormous dimensions that the output is worth one million dollars yearly, and another industry along side of it, and an outcome of it, the product of which is worth one and a quarter million dollars yearly.

There are two corporations known as Sanford Mills Company, and Goodall Worsted Company.

The Sanford Mills Company manufactures carriage robes, mohair plush, and horse blankets. The capital stock is $500,000, and the value of production for last year, was $1,000,000. The average number of hands was 693, of whom 416 were men, 156 women, 72 boys and 49 girls. The total amount of wages for the year was $300,000.

The Goodall Worsted Company manufactures worsted yarns, worsted goods for men's and women's wear, cloakings, and garment linings. The capital stock is $323,400, and the value of production last year, was $1,213,580. The number of employes is 718, of whom 381 are men and boys, and 337, women and girls. The total amount of wages paid for the year was $250,698.

In the two industries, there are employed 1,479 operatives, there are paid out $550,000 in wages, and the value of the production is about $2,225,000 yearly. The village of Sanford has a population of over three thousand people. It has fine stores, an opera house, several churches, a good hotel and as handsome residences as there are in any city in the State. The village of Springvale has about two thousand inhabitants, and the whole town of Sanford, about six thousand, or population enough for a city, if the people so desired. The plants of the plush mills and the worsted mills combined, cover more than eight acres of land. Hardly a year has passed that has not seen some addition to one or the other of these great industrial plants.

In 1895, the total product of all the woolen mills in Maine was worth $8,000,000. Of this amount, the mills at Sanford produced more than one-fourth. One specialty of the Sanford mills is mohair yarns, which are sold directly to manufacturers. About 4,000 pounds of mohair stock, and 800 pounds of alpaca stock, are used daily. The worsted mills turn out about 2,200 yards of ladies' and men's fine all wool worsted goods daily, which go to city jobbers as fast as made. No finer goods are made in this country, and the demand for them is greater than the supply.

Plush making is the specialty of the Sanford mills. Plush is a textile fabric with a sort of velvet nap or shag on one side. It is made of wool, silk or mohair. The latter is better for it even than silk. Mohair plush is soft and silky, is capable of receiving the most delicate shades of color, and does not lose its lustre. It wears well, and for upholstering car seats and carriages, it is superior to all other fabrics. For carriage robes, table and piano scarfs, wall and floor decorations, the Sanford plushes are beyond competition for elegance and beauty.

Mohair is the long, woolly hair, that grows on the back of the Angora goat, common in Asiatic Turkey. Pure Angora mohair is a brilliant white, lustrous fiber, elastic, wiry, and it will not mat or felt. The fleece of the average Angora goat weighs from three to six pounds. The medium long fiber of the fleece is that used in the Sanford mills for their finest plushes; the undergrowth or shorter wool is combed out for separate use. For imitation sealskin, beaver, otter, chinchilla and other furs, mohair is largely used. It is also worked into dress fabrics, laces, etc. To such perfection have these plushes been brought in the Sanford mills, that they cannot be distinguished from the imported article, and some of them cannot be matched in Europe.

A large portion of the mohair used in Sanford, comes directly from Asiatic Turkey. Large quantities are obtained also from California and Oregon, where the Angora goat has been successfully acclimatized; in fact nearly the entire product of mohair raised in this country goes to Sanford. Large quantities of alpaca, are also used. This comes from the back of the South American lama, the black brother of the Angora goat.

ning by February 1, 1900. By this action, the beautiful village of Springvale, which already has a large shoe factory and several smaller industries, will enter on a second era of prosperity and development. The Portland and Rochester Railroad crosses the town of Sanford, the station being about half a mile from Springvale village and a mile and one-half from Sanford village. In 1893, an electric road was built, connecting the two villages, and making connection also with the Portland and Rochester Railroad. It is both a freight and a passenger road, and is built so substantially that freight cars from the steam railroad are hauled over its tracks to either of the two villages.

Last year, the great electrical plant was built at Great Falls, and early in the spring of 1899, the work of building the Sanford and Cape Porpoise Electric Road was begun, and in August it opened as far as Kennebunk. It is now completed to Cape Porpoise, a distance of 22 miles. The Sanford and Cape Porpoise Railroad Company has leased the Mousam River Railroad and will operate it as a part of the former road. At Kennebunk, connection is made with the Boston and Maine Railroad, so that now Sanford has two outlets to Boston and the West.

The cars on the Sanford and Cape Porpoise Railroad, are of the most thorough and up to date construction, and the closed cars for the winter season are vestibuled and upholstered in plush of the latest design, manufactured by the Sanford mills especially for these cars. The building of this road is only another evidence of the enterprise and public spirit of the men who have been instrumental in making Sanford one of the most prosperous towns in the Pine Tree State.

WHITMAN AGRICULTURAL WORKS—AUBURN.

THE WHITMAN AGRICULTURAL WORKS.

The Whitman Agricultural Works stand alone in the State, in the line of goods which they manufacture, and, in fact, there are only three plants of like character in New England. In a general way, the output may be termed "Agricultural and Farm Implements," but these terms very imperfectly express the variety of useful, labor-saving powers, machines and implements, manufactured here. A partial list of these goods will be found elsewhere in this article.

The Whitman Agricultural Works were founded by Luther Whitman in 1834, in the town of Winthrop. The father of Luther Whitman, Ezra Whitman, was a clock maker, and some of the clocks made by him are said to be in existence at the present time. The son, Luther, evidently inherited some of his father's inventive genius and love of mechanics, for we find that he invented the first threshing machine for threshing and winnowing grain at the same time. He was also the inventor of railway horse power, also of the open straw rake on a threshing machine. He was the father of six boys and they were all brought up in the business.

In February, 1853, the plant in Winthrop was destroyed by fire, but was immediately rebuilt on the same site. In October, 1869, a large portion of the machinery was moved to St. Louis and a large plant established there. Four of the Whitman sons were put in charge of this plant, which has become one of the most extensive plants of its kind in the country, three of the Whitman brothers still remaining in charge. W. E. Whitman, the youngest son, remained in Winthrop with his father till 1876, when he bought the business and carried it on in his own name till December, 1883, when fire again destroyed the plant. For

the second time it was rebuilt, but in 1887 it was again destroyed by fire.

The Auburn Board of Trade at this time came forward and invited the management to come to Auburn. This invitation was accepted, a stock company was formed and incorporated in 1889, and the present magnificent plant was built in 1889 and '90. The main building is 106 feet by 55, four stories in height. The machine shop is 55 feet by 90, two and one-half stories in height. The storehouse is 100 feet by 40, four stories in height. Besides these, there are lumber sheds, etc., of ample capacity for storing the various kinds of lumber used.

The plant is situated between the tracks of two railroads, the Grand Trunk and the Maine Central, from each of which a spur track extends alongside the main building, rendering the shipping facilities perfect. A walk extends from the main building to the storehouse, passing over the tracks of the Grand Trunk Railway. A large elevator in the main building is another convenience for the handling of the raw material or the finished goods. The capital stock of the corporation is $100,000; the value of the production last year was $65,000; the average number of workmen is 60, and the total amount of wages paid last year was $24,000. The plant is in operation the year round. Power for running the plant is furnished by the Little Androscoggin Water Power Company. There is also an auxiliary steam power plant. The plant is steam heated, has electric lights, and is provided with electric bells.

To give some idea of the variety of goods manufactured in this plant we give the following partial list: horse powers, dog powers, threshing machines, sawing machines, fan mills, coffee fans and cleaners, double blast grain fans, steel drag-saw machines, wood cutters, magic feed mills or grist mills, monitor cider mills and presses—three sizes, Hutchinson wine and cider mills—two sizes, lard, wine and cheese presses, root or vegetable cutters, Derby feed cutters—four sizes, royal and imperial feed and stock cutters, folding saw bucks, garden wheelbarrows—seven sizes, with wood or iron wheel, green brick barrows, spring brick trucks, brick, coal, stone and wood barrows, clay and mortar barrows, clothes dryers, hand carts, express carts, leather and post-office trucks, meat, pork and ham trucks, castor wheel

merchandise trucks, factory, lumber, express and baggage trucks, box and dry goods trucks, warehouse trucks and skids, cotton, barrel and bag trucks, hotel, cheese and store trucks of all kinds, little giant box trucks, platform wagons of all kinds, little giant wheel jacks, folding hose reels, field, garden or lawn rollers, corn shellers, barrel headers or presses, harrows, whiffletrees and eveners, road scrapers, lawn settees, water barrel trucks, iron castings, plows, spring tooth harrows, weeders, corn-planters, cultivators, fertilizers, ensilage cutters, Dirigo feed and fertilizer distributors, and everything for the farm and dairy.

They are general agents for the P. M. Sharples cream separators and dairy goods both by hand power and steam power. They are also State agents for the Wire Plough Company of Batavia, N. Y., also State agents for the Standard Harrow Company of Utica, N. Y. Their list of goods is continually extending, and the manager, Mr. W. E. Whitman, is ever on the alert to test and adopt all practical labor saving devices for the farm, dairy, store or factory. The market for the output of the plant, is all New England, New York, Pennsylvania, New Jersey, Delaware, and the West. The company has also a large and increasing foreign trade. The business of the concern has more than tripled since 1890. The plant was enlarged in 1894, and now still further enlargements are contemplated.

The concern has always earned a better than 6 per cent dividend since it commenced running, and it was never in better condition that at the present time.

Luther Whitman, the original founder of the Whitman Agricultural Works, died in 1881, aged 79 years. W. E. Whitman, the present manager, was born in 1849. After attending the public schools in his native town, he attended and graduated from Towle Academy in Winthrop. He then entered his father's factory and served a regular apprenticeship, becoming familiar with the work in every department. He has been connected with the business ever since, with the exception of one year and a half spent in the grocery business. Mr. A. S. Whitman, the bookkeeper for the works, is two years older than his brother. He spent a number of years at the plant in St. Louis, then returned, and for many years has kept the accounts in a most efficient and satisfactory manner.

The workmen are all skilled mechanics, and are all Americans. The plant requires quite an amount of lumber in a year, the most of which comes from Maine forests. The various kinds of lumber used are beech, yellow birch, maple, red and white oak, spruce and pine.

The present officers are: F. H. Briggs, President; J. P. Hutchinson, Treasurer; J. W. Mitchell, Clerk; W. E. Whitman, Manager. Directors, W. E. Whitman, J. P. Hutchinson, F. H. Briggs, H. G. Foss, W. A. Robinson, W. A. Fiske, M. J. Googin.

The Whitman Agricultural Works fill a unique position among the industries of the State. Their workmen are employed permanently at fair wages, and the output is sold mainly out of the State, thereby bringing into the State an equivalent in money, to be put into our channels of trade or into other industries.

RAILROADS.

Table Showing the Number of Employes (excluding general officers) in the Employ of Steam Railroads in Maine, Wages Paid, etc., for Years Ending June 30, 1898 and 1899.

Name of Road.	Number employes, 1898.	Number employes, 1899.	Wages paid, 1898.	Wages paid, 1899.	Average daily compensation, 1898.	Average daily compensation, 1899.
Bangor and Aroostook Railroad.....	765	1,057	$284,006 98	$319,004 80	$1 62	$1 69
Boston and Maine Railroad	485	784	274,780 20	441,135 66	1 87	1 84
Bridgton and Saco River Railroad...	30	40	12,425 58	17,442 98	1 52	1 43
Canadian Pacific Railway.....	431	270	186,473 31	160,569 00	1 78	1 86
Franklin and Megantic Railroad	35	34	9,770 35	13,240 21	1 25	1 31
Georges Valley Railroad	10	11	3,611 40	4,211 40	1 56	1 33
Grand Trunk Railway	693	1,024	352,071 27	371,400 02	1 62	1 76
Kennebec Central Railroad	14	15	5,508 77	6,724 93	1 58	1 58
Lime Rock Railroad	20	23	9,737 17	13,878 34	1 71	1 72
Maine Central Railroad.....	2,570	2,733	1,355,127 52	1,421,287 97	1 73	1 69
Monson Railroad.....	10	11	3,609 07	3,740 80	1 53	1 52
Patten and Sherman Railroad	8	12	3,845 31	3,404 57	1 34	1 39
Phillips and Rangeley Railroad.....	53	50	13,916 97	18,396 55	1 43	1 39
Portland and Rochester Railroad....	235	227	107,627 48	108,283 86	1 67	1 64
Portland and Rumford Falls Railroad	234	247	88,487 95	98,810 43	1 52	1 58
Rumford Falls and Rangeley Lakes Railroad	72	59	27,690 13	27,596 50	1 52	1 49
Sandy River Railroad.....	35	38	12,882 30	15,372 95	1 41	1 38
Sebasticook and Moosehead Railroad	11	7	3,735 28	2,953 00	1 28	1 52
Somerset Railway.....	58	60	25,988 70	28,228 67	1 42	1 46
St. Croix and Penobscot Railroad....	28	34	8,160 60	4,569 08	1 36	1 43
Washington County Railroad	.....	205	.....	55,871 46	.....	1 61
Wiscasset and Quebec Railroad... ..	28	54	12,869 60	17,346 21	1 40	1 14
York Harbor and Beach Railroad....	27	41	10,224 93	8,941 92	1 76	1 53
	5,852	7,086	$2,822,550 87	$3,242,411 31		

RAILROAD EMPLOYES.

Through the courtesy of the board of railroad commissioners, we have been able to obtain from their forthcoming report, authentic information regarding the employes upon the railroads in Maine. This information is of great value, for it shows that a large number of the citizens of the State find employment in a class of work outside of the producing labor population; becoming consumers, instead of producers. Railroading may be properly regarded as much of an industry as that of manufacturing.

The number employed and the wages paid, for the year ending June 30, 1899, show a considerable increase over the year 1898. Against 5,852 employed in 1898, upon steam railroads, there were 7,036 employed in 1899, an increase of 1,184. The aggregate amount of wages in 1899, was $3,242,411.31, against $2,822,550.87 in 1898, a gain of $409,860.44. The report shows that the total number of days worked was 1,907,300 in 1899, against 1,856,734 in 1898, a gain of 50,566. That the railroads are a potent factor in the development of the State, needs no argument.

REDUCTIONS IN FREIGHT RATES.

Your attention is called to one especial feature of the operation of the Maine Central system which has 648.52 miles in Maine, namely, the gradual reduction of freight rates. The report shows that, in 1898, the freight rate per ton per mile was reduced, from that of 1897, .0005 cents per ton, and small as the reduction may seem, it made a total reduction of $101,741.85. In 1899, a still further reduction was made of .00183 cents per ton from that of 1898, which reduced the freight earnings $469,744.28 for the year. This was a direct saving of these amounts to the public.

MILEAGE OF STEAM ROADS.

An examination of the report shows that there was in Maine, June 30, 1899, 1,871.85 miles of steam railroad, 1,717.68 miles being broad gauge, and 154.17 miles narrow or two foot gauge. This is an increase of 124.54 miles, 115.33 miles being the addition by the construction of the Washington County Railroad, 5.59 miles of branch track of the Portland & Rumford Falls

Railway, and 5.25 miles extension of the Bridgton & Saco River Railroad, with additional spurs on the Bangor & Aroostook Railroad.

We not only see the commencement of an era of prosperity in the operation of railroads, by the constantly increasing volume of traffic, but an evidence of the increase of railroad construction. Since the close of the year ending June 30, 1899, 33.40 miles of railroad has been added to the Bangor & Aroostook Railroad system, by the construction of the extension from Caribou to Van Buren, so that now the long cherished desire of the general manager, Mr. F. W. Cram, is being realized, thereby putting under one system 365.76 miles of railroad, and bringing the inestimable farm and timber lands of northern Maine into connection with the business world.

MILEAGE OF STREET RAILWAYS.

The street railway mileage increased to June 30, 1899, over that of 1898, 71.48 miles, by the construction of the Penobscot Central Railway, 21.00 miles, from Bangor to Corinth; the Portland and Yarmouth Railway, 12.78 miles; the Benton and Fairfield Railway, from Benton Fiber Mills to the Maine Central Railroad, 2.41 miles; the Lewiston, Brunswick & Bath Street Railway, from Lewiston to Topsham, there connecting with the Brunswick & Topsham Railway, thence by building to Bath, connecting with the Bath Street Railway, and a branch to Sabattus, in all 31.53 miles; and extensions on the Portland Railroad system, 3.83 miles.

Since June 30, 1899, there has been put in operation, the Westbrook, Windham & Naples Railway, to South Windham, 5.33 miles, and the Sanford & Cape Porpoise Railway, from Sanford to Kennebunk and Cape Porpoise, with branches, 21.49 miles, making 268.16 miles of street railway now in operation.

This construction of steam and street railways, it will be observed, has an important bearing upon the labor question, as it adds, by new development, considerable numbers of workmen and distributes large sums of money to the working classes.

EMPLOYES ON STREET RAILWAYS.

The returns from street railways are not as complete as those from steam railroads, but it appears from the reports made to the railroad commissioners, that sufficient data was obtained to make a most accurate estimate of the number of men employed, wages per day, and amount paid the employes upon street railways.

The railroad commissioners' report shows that 864 men were employed, and $390,250.50 paid in wages. This was a gain in the number employed of 139, and $65,250.50 in wages. The wages per day, not including general officers, were about $1.50. Motormen and conductors it appears received from $1.43 to $1.60 per day.

As will be seen by the foregoing table, there were 7,236 persons employed upon the steam railroads, and dependent upon them there must have been at least 29,903 persons. There were dependent upon the employes of street railways, 3,672 persons, making a total of 33,575 persons dependent upon the employes of both steam and street railways.

The aggregate amount of wages paid, as shown in the table, to employes on steam roads, was $3,241,411.31, and upon street railways, $390,250.50, making a total of $3,632,661.81.

In this summary, the large number of men employed upon roads in process of construction, by steam and street railroad companies, since June 30, 1899, is not taken into account.

VOLUME OF TRAFFIC.

That some idea of the amount of passenger and freight traffic may be had of the business done by the steam railroads in Maine, extracts from the railroad commissioners' report have been taken, as follows: "The total number of tons of freight carried in Maine during the year ending June 30, 1899, was 6,539,200, against 5,646,376 in 1898, a gain of 892,824 tons.

"The number of tons carried one mile, was 465,951,675, against 425,482,639 in 1898, a gain of 40,469,036 tons.

"The number of passengers carried for the same period of time was 4,908,971, against 4,896,065 for the corresponding year of 1898.

"The number of passengers carried one mile in 1899, was 130,969,643, against 127,113,104 in 1898."

Since June 30, 1899, the gain has been constantly increasing, giving unmistakable evidence of the increased business activity throughout the State. Everywhere in the State, labor finds ready employment, and in most business at an increased daily pay. Nothing shows more clearly the prosperity or adversity of the business interests of the State, than the increase or decrease in the traffic upon the railroads operating in Maine.

NATIONAL CONVENTION OF LABOR BUREAUS.

EXTRACTS FROM PROCEEDINGS.

The National Association of Officials of Bureaus of Labor Statistics in the United States commenced its fifteenth annual session in the senate chamber of the State Capitol at Augusta, Me., Thursday, July 13, 1899, being called to order at 9:45 A. M., by President Carroll D. Wright, who said:

Gentlemen of the Convention: Our happy meeting at Old Orchard on Tuesday, our pleasant day at Portland yesterday, this delightful city of Augusta, and the weather which seems to have been arranged especially for us, all give token of a happy, profitable session of our body. In opening this convention I want to say a word or two of encouragement to you. At the close of our Detroit meeting some of you will remember that I called attention to the excellent character of the various reports of current work from the states represented. It seemed to me at that time, and as I have read over the reports in print this impression has been confirmed, that never in the history of the association did the current work show such a complete grasp and intelligent comprehension of statistical science as was then displayed. It showed that the commissioners of labor of the different states were thoroughly alive not only to the importance of their work, but to the importance of scientific methods in conducting it. I can now supplement that encouraging word with another, which is drawn from the reports themselves, as they have appeared from time to time since that convention was held in Detroit.

The grade of the work is increasing. The standard is being raised higher and higher, and notwithstanding the fact that governors of different states find it necessary to make frequent changes in some directions, each new man as he comes in has

the experience of his predecessors. He is able to take a lesson from the failures and successes as well, and understand more clearly and more thoroughly the real importance of the work committed to him. This is encouraging indeed.

Now these conventions which we hold are not so important in the form of sessions as they are in the interchange of views among the commissioners in a private way. We can talk with each other frankly and confidentially of the obstacles which each of us meet in our respective work. We can state things which we cannot state here formally and have go into print. We can speak of the political difficulties in our work, of the political opposition, sometimes, to it, when it would not be in good taste to discuss such matters in open and formal convention. Thus while we spend some time in what a critic might perhaps with some justice call a junket, nevertheless, that time after all is the most profitable which we spend. I think each and every one of you will coincide with me in that view, and that we must not think, if we spend a day in a trip down the harbor or anywhere which apparently is for pleasure, that we are losing that time. We come into open meeting and discuss the more formal methods of statistics. But in those private interviews, in the corners and on the street, we come nearer to each other's work than we can possibly in open session.

There is a matter to which I wish to call your attention and which it seems to me is of vital importance. The commissioner from Michigan (Mr. Cox) yesterday suggested that it might be well to take some steps toward a consolidation of this association with the Association of the American Factory Inspectors, and he pointed out some of the benefits which would result from such a consolidation. And before the close of this convention we may be able to see some way by which the initiative can be taken by this body, being the older of the two, and the first motion in that direction coming with propriety from our own association. I leave that with you, gentlemen.

In the work which we have before us here, under these delightful auspices, I think I may claim from each and every one of you that hearty and cordial co-operation with the chair which you have always given it. But before proceeding to our regular work I know you will be glad to listen to his excellency, the

governor of Maine, who has a word of cheer and welcome for us. I take pleasure now in presenting his excellency, Governor Powers, of the State of Maine. (Applause).

Governor Powers then addressed the convention as follows:

Mr. President and Gentlemen of the Convention: The State of Maine is indeed fortunate in having your convention assemble here, and we bid you one and all a cordial welcome. From personal conversation with a number present I am led to believe that as to many of you this is your first trip to Maine, this far northeastern State of the great republic which we all knew, until recently, was that portion of our country that first saw the rising sun.

I have no doubt that you will find here many things that may be new to you. There are many things in every state which the people of that state understand and appreciate but that may not be fully known throughout the other states of the Union. Hence the interchange of views at a convention by representatives of different states must necessarily be beneficial. As I understand it, one of the prime objects of the various bureaus of labor statistics is to assist, if possible, the man who labors. That is certainly an object to be encouraged. We often hear much said about capital and labor, and antagonism between them. I suppose they mean between labor and money, for to my mind labor itself is capital, and it is the capital which lies at the very foundation of all of our progress. I have often thought and said that labor had some disadvantages as compared with money, sometimes termed capital, in this, that in an inauspicious season money, or capital, as it is called, may withdraw and go into retirement; but the man who depends upon his labor for his livelihood must utilize it every day, or it is forever lost.

Now in the last fifty years in the State of Maine great changes have taken place in some of our industries, and I presume that is true of some of your states. Fifty years ago all along the coast of Maine were ship-yards. To-day the ship-yards may be there, but work in them is silent with very few exceptions. To-day our coast is dotted all along with cottages and summer hotels. Fifty years ago the summer visitor was hardly known. To-day we have more than a hundred thousand, and that number is constantly and rapidly increasing. Fifty years ago the

sails of the vessels built along the coast of Maine whitened every sea and entered every port. To-day we have but few compared with what we had then. Yet there are other industries, other vocations which are occupying the attention of our people. We have not increased in numbers. We cannot boast of so much wealth as some of our sister states. Yet we do claim that in all that constitutes true manhood we are the peers of any other state in the Union. We have some things that nature has given us. We certainly have a healthful and invigorating climate. We have an unrivalled sea coast, indented with a sufficient number of safe and secure harbors to float all the navigation and commerce of the world. We have grand and magnificent forests, and I wish you had the time to visit them. And while in some portions of our State the soil is not so fertile as the prairies of the far West, there are other portions of our commonwealth which have a very fertile and productive soil. And wherever it has been settled—for more than one-half of our area is forest to-day—you will find its hills and valleys dotted over with the comfortable, happy and contented homes of an industrious and frugal, and, I think, progressive people.

Is it then surprising that the State should feel proud of what it has done in the past? We are proud not so much of our products as we are of the men that we have sent from this State to almost every other state in the Union; proud of the men who have in every walk of life taken high rank, and who have filled not only in this State, but many of your states, conspicuous places of trust and confidence, and who are to some extent filling them to-day. I wish you had time to go throughout the borders of our State, to visit the northern and eastern portions, to visit the great lakes, the Rangeleys, Moosehead lake, and the forests. You would then have a more correct idea of why it is that we claim to produce strong, able and vigorous men.

But I do not intend to trespass upon your time. I know that you have business to do. I think we can congratulate ourselves, one and all, no matter from what state we come, that we are to-day enjoying an era of unexampled prosperity. Labor is almost everywhere, throughout our Union, remuneratively employed, and when labor is thus employed then we are enjoying progress. I think to-day in all that pertains to material

progress that we are making as rapid strides as we have ever made. I think there was one decade in which the census showed that for every day that the sun rose in the east and passed through the firmament and dimmed its rays in the waters of the great ocean in the west, more than two and a half million dollars were added to our wealth. I am confident to-day we are making even more rapid progress than that, for prosperity and content as a rule is everywhere throughout our borders. Some states may be enjoying more of it than others; but we are so connected together that it is almost absolutely impossible for any single state to enjoy prosperity or suffer adversity without all of the others to some extent sharing in it.

Gentlemen, again expressing my thanks to you for coming to our State and bidding you once more a hearty welcome here, permit me to close by expressing the hope and wish that you will be so entertained while among us that you will come again and that this will not be the last visit you will honor us with. (Applause).

The President: His honor, the mayor of this good city, is with us this morning, and I take pleasure in presenting to you Mayor Lane, of the city of Augusta.

Hon. Samuel W. Lane, mayor of the city of Augusta, addressed the convention as follows:

Mr. President and Gentlemen of the Convention: It gives me pleasure to welcome you to the city of Augusta. If I understand correctly, from the duties that devolve upon the commission in our State, your duties relate especially to compiling statistics, or to giving information to the public upon the commercial, industrial, educational, and social conditions of labor. The commercial conditions of the country, we are taught, embrace also civil contracts. Upon the invitation of our excellent commissioner last evening you witnessed the highest class of civil contract that can be entered into. That part of your entertainment I trust you enjoyed. The industrial part you are to perform to-day, so far as labor goes. It is the vacation season and we do not expect you to indulge very severely in manual labor, although I trust your mental work, your interchange of intellectual entertainment here will be found perfect, the air invigorating and conducive to the best results. The educational

part embraces the highest class of science, and when you come to the development of electrical science of the present age, we gave you an illustration last evening of what Maine can do in that line. But all nature smiles this morning a special welcome to you. And when I see that our friend, Dr. Hill, of the governor's council, is to entertain your president and our labor commissioner has the rest of your members in charge, I think nothing need be said in regard to your social entertainment while here.

I thank you, gentlemen, for the privilege of welcoming you, of looking into your faces and taking you by the hand. I have had the opportunity during my life to be for a brief time in almost every state in the Union, and consequently have a vague idea of the beauties which surround your respective homes; and while but a short time ago you in your home regarded that as the best spot on earth, I think you will agree with me that the sun rarely rises upon a more pleasing, inviting spot than the city of Augusta, to which I again bid you a hearty welcome. (Applause).

President Wright then responded to the addresses of welcome as follows:

Your Excellency and Your Honor: I believe I echo the sentiment of every member of this convention when I thank you most heartily for your kind welcome. We have come to Maine knowing something of the grand old State, as we have to call it. And yet we recognize that it is in fact, as a State, one of the youngest in the Union. It was born no farther back than 1820. It came out from Massachusetts, and was able then, as it ever has been since, to stand alone, conducting its own affairs in an honorable and a dignified way. So while Maine may talk of the mother country, you must look and see what she means by it, because literally she means Massachusetts, and if she refers to old England, she talks about the grandmother country, as she is a granddaughter of England, under these circumstances, and a daughter of Massachusetts, never so Puritanical as Massachusetts, but as progressive as England always is.

We recognize with the governor that the sun, so far as the United States is concerned, does rise here in the State of Maine; but most of us would like to know, gentlemen, just exactly where

the setting-place of the sun is going to be fixed, so far as the United States is concerned. (Laughter and applause). It may be that in a few years we can say with England when she says the sun always shines on the British Empire, that the sun never sets on all portions of the United States. Certainly whatever the outcome of the present movements may be, the east will find itself every morning with a fresher sun and expect to see as clearly as ever the true course for the United States to pursue. We recognize this when we think that this State is the State of good men and women. It is often said that Maine has but two raw materials from which its industries grow, ice and granite. They are hard to deal with, but they mean wealth, and we can add to these raw materials that Maine produces not only ice and granite, but good men and good women, a product of which she can be proud. We remember her governors, the Fessendens, the Washburns, the Dingleys, and we remember that other governor who showed how rapidly the State could go for one man. I don't remember when it was. But my good friend over here (Mr. Matthews) has been able to enlighten me of the administration of Governor Kent, and you know how Maine went at that time. Those were the old days of Democrat and Whig, if I remember correctly, and then originated the saying: "As goes Maine so goes the Union," because Maine held her election in September previous to November when the presidential election was held. That saying found its way all over the United States; but it has not always proven true, because once, if I remember correctly, while Maine has had her own wars, and notably the bloody (?) Aroostook war, she has had her civil war right in this room, and with her integrity and her knowledge of men and her courage, the civil war lasted but a little while. So that it is not always safe to say that as Maine goes so goes the Union in presidential elections. Nevertheless, for a long term of years that saying did hold true, and it may hold true again.

We honor Maine. Maine honors us to-day, gentlemen, in her welcome to us, and may we gain inspiration from her character and from the warm welcome she has extended to us. And to his honor we can say that we thank him for his welcome. He says that nature smiles this morning. I trust nature is the only member of this convention that has "smiled." (Laughter). I

feel a little shaky about it, however, but I hope it is so. The manner in which Augusta cared for us last night evinced her desire that no member of this convention should be struck by lightning, and was impressive. I don't believe that any of you were ever in a place before where they took in their street cars as soon as it began to rain. Now that was the expression of a desire on the part of the city of Augusta to prevent our meeting a negative current of electricity while traveling on their excellent street railway. And at our hotel we noticed the same care during the exemplification of the great powers of the universe. But it is a beautiful city, in a different guise, and a gentler creature, this morning, from which we can take our cue for the harmonious work of our convention. (Applause).

A call of the roll of states by the secretary disclosed the attendance of the following named gentlemen:

Carroll D. Wright, United States Commissioner of Labor.

W. D. Parker, Chief Clerk, Connecticut Bureau of Labor Statistics.

Horace G. Wadlin, Chief of the Bureau of Statistics of Labor, Boston, Massachusetts.

James W. Latta, Secretary of Internal Affairs and James M. Clark, Chief of Pennsylvania Bureau of Industrial Statistics.

David Ross, Secretary of Illinois Bureau of Labor Statistics.

Thos. P. Rixey, Commissioner of Missouri Bureau of Labor Statistics.

John B. Conner, Chief of Indiana Bureau of Statistics.

John McMackin, Commissioner, and H. C. Southwick, Chief Clerk, New York Bureau of Labor Statistics.

Joseph L. Cox, Commissioner of Michigan Bureau of Labor and Industrial Statistics.

W. L. A. Johnson, Commissioner Kansas Bureau of Labor and Industrial Statistics and Factory Inspections.

W. E. Faison, Assistant Commissioner, Bureau of Labor and Printing of North Carolina.

Samuel W. Matthews, Commissioner of Maine Bureau of Labor Statistics.

Martin F. McHale, Commissioner of Minnesota Bureau of Labor Statistics.

L. H. Carroll, Commissioner New Hampshire Bureau of Labor.

Archer P. Montague, Commissioner of Virginia Bureau of Labor and Industrial Statistics.

Halford Erickson, Commissioner, and Chas. Lewiston, Assistant Commissioner Wisconsin Bureau of Labor, Census and Industrial Statistics.

The President: I am informed that Prof. A. E. Rogers, Professor of Constitutional Law at the University of Maine, at Orono, is here and will now address us.

ADDRESS OF PROF. ROGERS.

Responsibility of Corporate Organizations to the Public.

Gentlemen: In attempting to discuss a question pertaining to the privileges and powers of corporations, I am aware that I am venturing on ground where angels might fear to tread, and am liable to be rated as one to whom the old adage applies. Nevertheless, I feel sure that this matter at the present day needs, above any other, calm and dispassionate discussion. The declamations of demagogues and of would-be economists and reformers in regard to corporations and corporate power are having an influence entirely disproportionate to the intelligence required to frame them, and this influence is the greater and more harmful from the fact that together with the multitude of errors and absurdities that they contain, there are many truths that appeal strongly to our sense of right and justice.

The huge corporations, capitalized at tens and scores of millions of dollars each, and organized to crush competition, to limit production and to control prices, and the great combinations more properly called trusts which are formed for the same purpose and are but the offspring of corporations, are an evil in our social and industrial life, and the monopolies which they seek to establish are no less a curse than were monopolies in the days of Coke, unless, indeed, we accept the arguments of the socialist —hold as our industrial ideal State ownership and control of all means of production. Corporations organized, as they are every day, by unprincipled persons for the purpose of fraud and swindling are not the less knavish from the fact that the open-door to their knavery is a statute duly made and provided by a legislative body.

That these evils exist is generally believed and generally admitted, and the welfare of our political and social organism demands that they should be abated; the difficulty lies in establishing a sure and safe basis on which to commence the work of reform, and, if reaction there must be, in so guiding the reactionary forces that they may be constructive, not destructive.

Study and investigation of many economic questions, such as rate of wages, interest, profits, labor-saving machinery, division and specialization of labor, and the like, often leave us after our facts have been ascertained or our theories framed, helpless in the face of these facts and theories. This too frequent confession of helplessness on the part of the student justifies to a greater or less extent the characterization of political economy as the gospel of despair, and furnishes the keenest of weapons to those who attack our present industrial system.

A careful study of the theory and conditions of corporate organizations, however, cannot fail to be fruitful in positive results, for this all-important factor in our social and economic life is of our own voluntary and immediate creation, the product of the law. If abuses exist and intelligence be not lacking, these abuses can be remedied by the same means that gave opportunity for their existence; and not only this, but the usefulness of the organizations themselves may be greatly increased when we come to understand and appreciate their legitimate purpose and functions.

Although the life of our common law has been, as Judge Holmes says, experience, the organism through which this life manifests itself is precedent. As is the case with the human body, some parts of the legal organism that once served a useful purpose persist after their usefulness has disappeared and become a source of disease and danger by impeding functional activities essential to life and growth under new and more complex conditions of existence.

The development of the law of corporations in England and this country affords a striking illustration of this fact.

The fiction of the personality of these organizations served its purpose in an age when searching legal analysis was unknown; in those earlier days, it was easier, perhaps better, for the sake of simplicity and clearness of thought, to attribute to a single ficti-

tious person the special rights and obligations of several individuals associated for certain purposes, than to consider such special rights and obligations as pertaining to the individuals themselves.

So long as this question remained a merely academic one, a theme for legal scholastics, we can look with good-natured tolerance on such solemn nonsense as the following, even though it appears under the guise of a judicial opinion—

> * "None but God can create souls,
> The king creates corporations,
> Hence, corporations have no souls;'

a syllogism whose conclusion has been of the greatest use to many reformers in making up for a deficiency of ideas. But when we find modern legal conceptions and rules, and modern legislation concerning economic policies of the greatest moment, influenced and shaped by deductions from this ancient fiction, and also see reasoned out of practical existence from the same premise, the fact that the historic, legal, and moral justification for the existence of the corporation lies in the advantage to the public to be gained thereby, we may well be excused for an intellectual revolt on a small scale, and believe that in some respects, our present corporation laws are the evolution, not of fundamental truths, but of fundamental errors.

It is quite unnecessary for me in this presence to discuss the part taken by corporations in our present economic system; we all know that without them this system could not exist. Until we go back to the days of the hand-loom, of the sailing-vessel, and of travel by stage-coach, or come to governmental socialism, pure and simple, corporations will remain indispensable. The building and maintenance of railroads, the establishing and operating of vast manufacturing plants, and the thousands of enterprises of a like magnitude that have made the last fifty years the most wonderful period in the history of the human race, demand, from the very character of the undertakings themselves, such a continuity in the consistent prosecution of plans and purposes, as cannot be measured by the life of a single individual. The immense amount of capital, also, required in such enterprises demand co-operative investments on the part of a large number of persons; of these the great majority must, obviously, be denied the right of any direct interference or control, must entrust the management of the undertaking to others; hence

from the very nature of the case, to effect the aggregation of this capital, there must be, to a greater or less extent, limited liability on the part of the investors. These two facts, continuity in the prosecution of the undertaking or enterprise, and limited liability on the part of the investors are the essential characteristics of the corporation as we know it to-day.

The theory that corporate organizations had their origin in ancient Rome has of late been questioned by some investigators who are inclined to look for their sources in the history of the early Greeks. A comparative study of institutions leads me, however, to believe that in the solidarity and continuity of the family, not only among the Greeks and Romans but among many, if not all, of the earlier races ethnically related to them, we find the source and prototype of corporations of every kind, aggregate and sole, governmental, ecclesiastical, and lay. But whether of Roman origin or not, it was in Rome as the power of the central authority grew greater, and as the family lost more and more its autonomic character, that the conception of the unity and continuity of a group of persons extended from the association united by bond of kinship, to other organizations, naturally, at first, to those exercising some of the functions of the earlier family, such as colleges of priests, and afterwards, as opportunities for great enterprises of a private nature resulted from the increasing wealth and commerce of the city, to organizations whose main purpose was private advantage.

Fortunately, it is not necessary in this connection for me to discuss, or to attempt to discuss with any fulness of detail, the development of the Roman corporation. What I wish to lay before you is the fact, that in this city whose laws and whose legal conceptions concerning corporate organizations have had so much influence in shaping our own views and our own policy, the earlier forms of corporations precluded the idea of private gain or individual advantage.

In early England, aside from the towns which we have good reason to believe to be developments of the family organizations, the nearest approach to the modern corporation is the church; but the ecclesiastical organization, even, did not consciously base its unity or continuity upon the succession of individuals; God or the different saints, to whom the church establishments and

lands were dedicated, were individually held to be their actual owners, and the ecclesiastic were regarded as administering the property in the character of agents or stewards. But the ecclesiastical law, derived as it was from the Roman law, on the revival of the study of the latter easily appropriated its maxims and doctrines; as a consequence, the proprietor-saint was gradually supplanted by a vague personification of the church; the lay courts had only to recognize this fiction to clear the way in the English law for the being so forcibly described in later times as having "no body to be kicked and no soul to be damned."

Side by side with the ecclesiastical organizations in England there had existed the local political and administrative organizations, counties, boroughs, towns, and manors, which Pollock and Maitland in their "History of the English Law" designate, for want of a better term, as "land communities." Under the influence of these, to represent which no fictitious person had been imagined, and of the ecclesiastical organizations, we find a new kind of corporations coming into existence, partaking of the character and tendency of each of the earlier forms. The most important examples of this new type are the trade and merchant guilds and the universities, the latter showing the natural predominance of the ecclesiastical influence in the very name, the word *universitas* being but the Roman law term for corporation.

In discussing these new organizations, the learned writers above referred to say: "The English temporal corporations when they first appear as ideal persons, appear not in the character of mere private persons, but in the character, we may almost say it, of governmental officers and magistrates who hold property in the right of their offices. Their lands, their goods, are few, what they own is jurisdiction, governmental powers, and fiscal immunities. This is a characteristic feature of our temporal corporations in the first stage of their existence; the artificial person comes into being in order that he may govern and do justice to the profit and ease of the members of the corporation, no doubt, for no one governs or does justice without gaining thereby, but it is as much within the sphere of the public as within the sphere of the private law that the nascent corporation becomes active."

As in ancient Rome, so in England, with the development of commerce and wealth, the private character of these organiza-

tions was more and more emphasized, but the complete extinction of all idea as to their public character is practically a thing of our own day. Blackstone, writing as late as 1765 of the organization of corporations could declare: "It has been found necessary, *when it is for the advantage of the public* to have any particular rights kept on foot and continued, to construct artificial persons, who may maintain a perpetual succession and enjoy a kind of legal immortality."

Within the past fifty years, as a result of the tremendous economic forces that have been called into existence, and of legislative action facilitating the establishment of corporations, these organizations have assumed a character in our industrial life that is almost revolutionary. Seventy-five years ago, the number of corporations in this country, aside from banks, was so small, that as an economic factor, they might be safely disregarded. As to the condition to-day, I can do no better than to quote from an address delivered by Justice Field at the centennial celebration of the organization of the Federal Judiciary:

"Nearly all the enterprises requiring for their successful prosecution large investments of capital are conducted by corporations. They, in fact, embrace every branch of industry, and the wealth that they hold in the United States equals in value four-fifths of the entire capital of the country. They carry on business with the citizens of every State, as well as with foreign nations, and the litigation arising out of their transactions is enormous, giving rise to every possible question to which the jurisdiction of the Federal courts extend."

Legal rules and conceptions wherein transitions and modifications may gradually take place are easily and readily adapted by the courts to changing social and economic conditions. But when the rule or conception is of such a nature that modification or transition means a denial of the rule or conception itself, such a rule or conception, if it have the sanction of age, is exceedingly tenacious of existence. Courts must adhere to precedent, if legal development is to be orderly and consistent, and legislation must be in accord with the spirit of the legal development of a country as it finds expression in the decisions of its courts, if the law is to remain an organic whole.

Through this wise and necessary conservatism, however, an erroneous legal conception or rule, harmless, perhaps, under the

conditions in which it was first formulated or came into existence, may be perpetuated under new conditions that will render it not only an evil in itself, but a source of other evils that will survive the death of the parent error.

The early ecclesiastics of England introduced bodily into their canon law the Roman fiction of corporate personality. The lay courts grafted upon the English law this branch, alien not only in its origin, but alien in its character, and alien in its development. Much of the law of ancient Rome has been made a part of the English law and completely assimilated. But this conception of the artificial personality of an organization, as such, was not and is not capable of assimilation or of beneficent tendencies in a system of jurisprudence whose very essence lies in the fact that it contemplates the individual as the legal and political unit.

A corporation is a collection of individuals to whom, as individuals, special powers and privileges are granted under certain conditions by the State, the most important and characteristic of these powers and privileges being limited liability, and capacity to individually transmit the special rights so granted under the same conditions that they received them; or, as Judge Finch, of New York, so well said in giving the opinion of the court in the case of the People *vs.* North River Sugar Refining Company, (21 N. Y. 582) "The state gave the franchise, the charter, not to the impalpable, intangible, and almost nebulous fiction of our thoughts, but to the corporators, the individuals, the active and living men, to be used by them, to redound to their benefit, to strengthen their hands and add energy to their capital."

Wherein do we find the justification for such a grant, in other words, for the existence of the corporation? Certainly not in the advantage accruing to its members from the fact that they are endowed with special legal powers and privileges by the State, for it is a fundamental principle of our jurisprudence that all citizens are equal before the law. A departure from this fundamental principle is warranted only when an advantage to the people as a whole, to the public, is to be secured thereby; hence, in the securing of such a public advantage must lie the justification for the existence of each and every corporation.

The origin and history of corporations support this view, and it is only within a half-century that we have come to look upon them as being essentially, if not wholly, of a private nature.

Chief-Justice Marshall in 1819 speaking for the supreme court of the United States in the famous case of Dartmouth College *vs.* Woodward (4 Wheat 518), said: "The objects for which a corporation is created are universally such as the government wishes to promote. They are deemed beneficial to the country; and this benefit constitutes the consideration and, in most cases, the sole consideration of the grant." It is clear from the context of this opinion that the term "benefit" as used here by Judge Marshall, does not signify the benefit that accrues to the public from the establishment of any legitimate and honorable enterprise, but only such benefit as cannot ordinarily be secured through the undertakings of an individual or of individuals exercising only such legal powers, and enjoying only such legal privileges as pertain to citizens generally. This is clearly shown by the subsequent declarations: "Charitable or public-spirited individuals, desirous of making permanent appropriations for charitable or other useful purposes, find it impossible to effect their design securely and certainly without an organizing act. The benefit to the public is considered as an ample compensation for the faculty it confers."

Again, as late as 1850, we find the supreme court of North Carolina combating the tendency then at the inception of its rapid development, in these words: "The purpose in making all corporations is the accomplishment of some public good. Hence the division into public and private has a tendency to confuse and lead to error in investigation; for unless the public are to be benefited, it is no more lawful to confer exclusive rights and privileges upon an artificial body than upon a private citizen." (Mills *vs.* Williams, II Iredell.)

Unfortunately, however, in Dartmouth College *vs.* Woodward, which was to have so great an influence in shaping the corporation laws of this country, the court held to the ancient fiction of legal personality, declaring: "A corporation is an artificial being, invisible, intangible, and existing only in contemplation of the law. Being the mere creature of the law, it possesses only those properties which the charter of its creation confers upon it, either expressly or as incidental to its existence."

Here the court denies, by necessary implication, the very principle on which is based the doctrine that benefit to the public is the consideration which gives the charter of incorporation the nature of a contract on this "creature of the law" must be the result of not a party to, this charter. Conceding that the corporation is an entity, a legal person, the assumption that special powers and privileges are conferred upon it as such by the state is manifestly illogical, for it is the very grant of these powers and privileges that creates this entity, this person, prior to the grant, the corporation does not exist; the grant, then, must be made to the individuals taking part in the act of incorporation. If we accept the fiction of legal personality, we can only reach the final conclusion of the court that the charter of incorporation is a contract on the assumption that a grant, under certain conditions, of special powers and privileges to certain individuals is made in consideration of a benefit to the public to be derived from and resting as a responsibility upon a distinct individual created by the same grant, hence coming into existence subsequently to it; a proposition condemned by the elementary principles of logic as well as of law.

Again unfortunately, of these two inconsistent views of the court, that which looked to the attainment of a public advantage in the organizing of a corporation was ultimately to go to the wall, while that which the corporation regarded legal personality, was to endure and shape not only future judicial opinions and future legislation, but, through its apparent simplicity, to mould even popular ideas and popular conceptions.

Had the court in this, I had almost said fateful, opinion, looked beyond the fictitious person to the real persons whose rights and privileges arising through the incorporation were to be affected, its reasoning would have been, as its conclusion is, incontrovertible, the fundamental doctrine that the justification of the corporation lies in the fact that an advantage to the public is to be secured thereby might have remained a guiding and formative principle, and many of the evils now existing might well have been avoided.

It is a legal maxim, that where the reason ceases, the law ceases; but at present, either the doctrine that charters of incorporation are contracts must form a notable exception to this rule,

or the public advantage as a consideration supporting such contracts must be a fictitious creation of the law, even more vague and unsubstantial than the intangible and invisible personality existing so long in the imagination of learned jurists.

Mr. H. O. Havemeyer, speaking before the United States Industrial Commission a short time ago, expressed the logical consequence of present conditions, if not the generally accepted idea of to-day, when he said: "I maintain that it is immaterial to the public in what form business is done, whether by an individual, firm, corporation, or even a trust. They are merely forms of conducting a business, in other words, machinery for the operation of business."

Compare this with the following, taken from the opinion of the supreme court of the United States given in 1865 (3 Wall. 51) in the Binghamton bridge case: "The purposes to be attained (by incorporation) are generally beyond the ability of individual enterprise, and can only be accomplished through the aid of associated wealth. This will not be risked unless privileges are given and securities furnished in an act of incorporation. The wants of the public are often so imperative, that a duty is imposed on government to provide for them; and as experience has proved that a state should not directly attempt to do this, it is necessary to confer on others the faculty of doing what the sovereign power is unwilling to undertake. The legislature, therefore, says to public-spirited citizens: 'If you will embark with your time, money, and skill, in an enterprise which will accommodate the public necessities, we will grant to you for a limited period, or in perpetuity, privileges that will justify the expenditure of your money, and the employment of your time and skill.' Such a grant is a contract, with mutual considerations, and justice and good policy alike require that the protection of the law should be assured to it."

The continuous increase in strength and prominence of the personality idea at the expense of the principle that the justification of the corporation lies in the advantage to the public to be gained thereby, has been the result of patent causes: Enterprises whose main object, at least from the standpoint of an increasingly large and increasingly influential body of our citizens, have developed in number and magnitude during the past

fifty years in an almost incredible manner; legislation, shaped in part by questionable means, and in part by desire to encourage great enterprises, has too often thrown conservatism to the winds, and, finally, the character itself of our people has had a tendency in the same direction, for we are inclined to look upon loose corporation laws as Democratic in their nature, inasmuch as they offer equal privileges to all persons for all purposes; we are apt to lose sight of the fact that the very essence of these laws is discrimination, the granting to some individuals of special rights and privileges which the sound policy of the law denies to our citizens generally.

In the State of Maine, to-day, we may find corporations organized to run clothing stores, to sell groceries, to sell drugs, and, in short, for various enterprises that could just as efficiently be undertaken without any grant of special legal powers and privileges; the sole purpose in the great majority of these cases is to limit personal liability, to avoid that responsibility which the citizens of the State generally must bear. As well might the farmer demand of the State a grant of limited liability in his calling, or the laborer that he be relieved of his debts when opportunity for work is scarce or he becomes temporarily disabled.

As an illustration of the abuses existing in this State, which is, I imagine, in this respect, a fair average among the states of the Union, better than some and worse than others, I wish to read a clipping from a Bangor daily newspaper of a recent date, the paper having been picked up at random:

(The clipping shows that in two days there were filed certificates of incorporation of nine organizations whose total capitalization was $2,220,000, while the amount actually paid in was $1,093, or less than one-twentieth of one per cent. Eleven of the sixteen officers named were citizens of another state.)

It may be that every corporation mentioned in this clipping was organized for legitimate purposes and for the public advantage, but the fact remains that corporations for fraudulent purposes might just as easily have been formed; the sovereign power of this State, if it has not been, may easily be, prostituted to further the dishonest schemes of dishonest men through our present loose system of corporation laws, and this, I suspect, may be said of nearly every other state.

In our country at large, such a thing as a system of corporation laws can be scarcely said to exist. From the national standpoint, we have a vast tangle of heterogeneous statutes which the legislatures of the different states are constantly making more inconsistent and confusing.

In general interstate comity has thus far been sufficient to prevent any state from excluding corporations organized in another from transacting business within its limits, but symptoms of unrest are to be seen. It is certainly becoming a question how long this respect for a sister commonwealth that has no respect for its own sovereign power will endure, how long, indeed, it should endure. Discriminating legislation would undoubtedly lead to retaliation, and perhaps, finally to reform, but this road would be a hard and thorny one.

Though the question as to the nature of corporations is, in a certain aspect, a purely legal one, it is in another and vastly more important aspect, a matter of grave economic interest to us all.

Many of the evils resulting from these organizations had their origin in an erroneous legal conception, but so completely have deductions from this conception, the immediate causes of these evils, become established as a part of our legal system, to a certain extent by frequent judicial recognition, and still more by positive legislation, that they are practically beyond the controlling influence of the courts.

Reform, then, must come through legislation, and that this legislation may be effective as well as conservative, it must be based on clear conceptions as to the nature of its subject-matter, on an appreciation of the fact that a corporation is but an association of individuals to whom, as individuals, the state makes a grant of special legal powers and privileges, of the fact, also, that this grant can be justified in our system of jurisprudence only on the ground that a definite advantage to the public is secured thereby.

In the domain of law, which is that of ideas, and principles, and reason, ultimate truths are the only safe foundation on which to build. Legal fictions often have highly important functions in unifying legal rules; they serve, so to speak, as a scaffolding, useful in raising the structure of our jurisprudence, but constituting no real part of it. In determining and shaping grave

economic conditions fictions, legal or otherwise, have no place, we must be guided by the absolute facts of human life and human experience.

As civilization advances, and as science, and wealth, and trade, increase, the public and private relations of the different members of society become more complicated, and laws, as a necessary consequence, become more numerous and more complex.

To understand even a branch of the legal system has become the business of a learned and laborious profession. But the great principles along whose lines the development of our substantive law should proceed, must be the business of all enlightened and thoughtful men, if we are to realize in our jurisprudence that justice so well described in the institutes of Justinian as being "the set and constant purpose which gives to every man his due." (Applause.)

The President: The subject is open for debate.

Mr. McMackin of New York: I would like to ask the professor a question. Does he consider that we have been accommodating our legislation to the exigencies of special cases and that we owe most of the conditions that exist to the acts of the legal profession.

Prof. Rogers: If I get the question clearly, it is as to whether the different acts of legislation haven't been, each and all, along beneficial lines. No, sir, I do not think that they have. I think that there are certain great principles of right and justice in our social and political organization. I think that we may and do depart from them, and disasters follow. When an unjustifiable departure is made from the fundamental principle that all men stand equal before the law, I care not for what purpose the legislation is, I say that legislation is working evil.

Now perhaps that brings me to another question, that of trusts. I am aware that the creation of these vast corporations do work some good in a certain direction, for instance, the Standard Oil Trust. We know that the production of oil itself has been cheapened to the consumer, and that may be true in other directions. But on the other hand comes this question: What of the individual? What of the people for whose uplifting and enlightenment and well-being even the very existence of property itself is to be justified? I will answer that by referring to some histor-

ical precedents. Look back in England when they had the system of small holdings turned over into the system of large holdings on the ground that agriculture would be bettered thereby, that larger crops could be gained. Well and good; the same thing would hold true in Ireland when the tenants were evicted for the purpose of creating sheep walks. The raising of wool and the sale of mutton were more profitable; but what of the people? I say the same thing in regard to these combinations of to-day. They may possibly effect a saving and cheapen production by eliminating competition; but I believe the total effect is to destroy initiative on the part of our people generally; that, really, the logical results of the tending in this direction is state control and ownership of all means of production.

Mr. McMackin: I think the professor has answered correctly, and I think a great many agree with his deductions, that the men who are principally responsible for the creation of our large trusts are perhaps the most dangerous enemies to American institutions to-day. They are positively blind to the consequences of their own action. But that does not alter the case. We are dealing with a practical problem, and the great question that presents itself to the American people to-day is: What are we going to do about it? We have surrounded those trusts and corporations with laws skilfully drawn. They are surrounded with every protection, and sometimes, according to newspaper report, doubly protected by a judiciary often selected by the very corporations themselves, so that the American people to-day are confronted with a condition of affairs that is very dangerous. Now the question arises: What *can* you do about it? The same law that would apply to the nullification of the charter of a corporation, to a restriction of their powers, would equally cover the organizations of workingmen, and limit their activities in many respects. So that the question naturally arises: What can the state now do to remedy the evil that the state has permitted? Can we limit their capital? Can we make them responsible—make them liable beyond their capital invested? Can we limit their amount of bonds to the amount of capital actually paid in? Perhaps the greatest evil of our corporations to-day is that the trade of the country is compelled to pay interest on millions of capital that has no existence. If that could be made a crime, then I think we would be making a long step in the direction of

rectifying the evils of trusts; but proceeding as we are to-day, with the press of the country almost unanimous in sustaining even the most outrageous combinations, there can be no other end than either revolution or state socialism. It is the logical sequence of the whole business. I certainly would be glad to get some light as to the remedy to rectify the evil, which I lay principally at the door of the legal fraternity of the United States.

Mr. Cox, of Michigan: Mr. President, discussion has been invited. I have been very much interested in the paper just read. I notice that our learned representative of the law suggests legislation as a proper remedy for some of the evils complained of, and we are quite agreed with him if some of the constitutions of states and possibly of the United States, were properly revised and amended. To make myself clear I will state that, for several years past many friends of Governor Pingree, of Michigan, have fought and won victories through legislative enactments, only to find our new laws declared unconstitutional by the supreme court. Now I do not wish to be understood as especially questioning or criticising the supreme court of Michigan or any other state, but have simply stated the facts. In my opinion the place to correct many of these evils is at the fountain head. I believe that the first steps to be taken are in the direction of amending various constitutions so that thereafter the work of honest politicians and legislators may stand as constitutional law—not to be tinkered with by the whims of courts and the efforts of unscrupulous lawyers, retained by corporate interests.

I am always glad to be classed among reformers, but do not want to be placed with the family of cranks. Practical and substantial reforms and laws are needed, and with all the discussion we have had upon the subject of trusts and monopolies and their regulations it yet remains for some wise head to suggest means for controlling and limiting these gigantic institutions. There are radicals who want them exterminated, yet I do not believe that much can be done by legislation, in the manner that will stand the scrutiny of the court, until constitutions are amended. I fear that the final results of all efforts of legislation, so long as our courts must hold the constitutional prerogatives, as they

do—the rights of persons and capital to invest where they may and the rights of labor to singly or collectively work or refuse to work. This is indeed a complex question and every test to be made in the future, as in the past, will be weighed by privileges of American citizenship and rights under the constitution.

Mr. Conner, of Indiana: Mr. President, I am pleased with the paper that has just been read, but I do not now feel like discussing the questions growing out of it, except to make two or three allusions to the matter. It is a paper and a subject that we may well study, and I want that privilege. But, Mr. President, in considering the legal questions as they have developed in legislation, we must remember one thing, and that is that the stream never rises higher that the fountain. If we have come upon evils from incorporations, both public and private, they are first to be traced back to the source of power. The people are the source of all authority and power and they may well modestly assume their part of the responsibility so far as the legal features are concerned. And so we should not rail at others, at least we should be modest in our allusion to the legal phases growing out of public and private corporations and the trend of trusts. Furthermore, I think I am right in saying that courts have reconstructed and revised their opinions, as legislatures have, because of new conditions and factors developed by growth, so that an entirely new phase is put upon the law.

I think this paper points to the solution of very many things now in the public mind, and while I do not feel capable of considering the question now and discussing it, I am very glad that it has been presented to our association and hope that it may go into our proceedings that we may study it. It is unnecessary to make a motion to that effect I believe?

The President: Not at all necessary.

Mr. Powers: I do not rise to discuss the paper which is full of suggestions; but I do wish to ask one question as to a matter which I think was not made clear to my mind. The professor, as I understand it, finds that all the evils in corporate management are from a shifting of the decisions and the basis of law relating to corporations, from the principle of a benefit to the public to the matter of making the corporation a soulless entity. And he tells us that all these evils can be corrected, substantially,

by bringing the law and the decisions relating to corporations back to the principle of the good of the public, if I have understood correctly. Now the whole question seems to me to be thus: With the courts departing from the principle laid down by Marshall, how are we going to get the supreme court to change its line of decisions? How are we going to have our corporate law enacted by the legislature, based upon the Marshall decision?

Prof. Rogers: I would in part answer the question in this way: If I am right so far as the question of fictitious personality destroying the fundamental principle of advantage to the public, then the first thing is to restore that fundamental principle and insist the corporation itself is to be justified only on the ground of advantage to the public. Now how are we to shape our legislation? Gentlemen, I am very modest. I brought this paper before you to-day for discussion, and if I have planted the smallest seed toward correcting these evils, I have done a grand, good thing in that respect. Now, if I am right, and you gentlemen hold that I am right, and you stand for what you believe, there will be a tremendous public power toward shaping legislation in that direction.

As to the supreme court upholding that a charter of incorporation is a contract, I believe that at the present time jurists recognize that the position is not very logical, and this from the very fact that we have drifted away from this idea of public advantage. I think you will find many constitutional lawyers, and very close students, strongly questioning the idea that a charter of incorporation is a contract. I do not. I believe it is a contract. If we have an intelligent public, fully appreciating the situation, I believe that not only legislation, but the decisions of the court, which will generally follow public conditions, will right the matter. The decisions of the court are not like the laws of the Medes and Persians—unchangeable—and I believe that with proper legislation, corporation law turned in the proper direction and limited there, we shall find judicial errors correcting themselves. You are investigating questions of labor. You are accumulating statistics. You do not expect all the evils you find can be remedied at once; but you are studying the conditions and in hope by and by that the remedies for those evils will grad-

ually be embodied in positive legislation. But you cannot do it all at once. The trouble with most of our anti-trust legislation lies in the fact that it is an attempt to destroy evils while leaving the causes of these evils intact. To effect great reforms we must leave a basis in sound principles; we cannot build our legislative house and put it in the air with no foundation, like the coffin of Mohammed. It must have a foundation or it will come down.

Mr. Ross, of Illinois: It occurs to me that in the discussion of a question of this kind we should not take up too much time in an effort to make technical definitions of terms. The paper read by the professor deals with a live issue and it should be for the people, and particularly the men who are interested in economic questions, to determine if they can, what the effect or results of the system have been; not as to the particular nature of a definition, but as to the actual, positive results flowing from the different industrial conditions.

The learned professor has referred to the Standard Oil Trust. I presume that corporation is a monopoly. I think it is the father of monopolies so far as the United States is concerned. He has stated that the price of the very necessary product of that corporation has been materially reduced to the people since the organization of the trust, and has intimated that a similar result may be anticipated from the organization of other trusts. I take the position that if that is true, and I believe it is—the effect of these vast aggregations of capital under proper regulations, call them trusts, or what you please, is in the line of greater economy. If the men who are employed in productive industry are to have their wages increased, as they recently have—if those conditions and results are to flow from this new system, then we ought to exercise some discretion and avoid catering to a false sentiment by indulging in unmeasured denunciation.

I have faith, Mr. President, in the ability, integrity and character of the American people, and see no danger ahead. I can look forward into the future with great confidence, believing that the improvements that have come during the last fifty years will be quadrupled in the next twenty-five. I sometimes lose patience with our faddists. The world has had them in every generation, and no doubt will continue to have them as long as life lasts. Dr. Malthus, you know, was going to revolutionize the world.

He became imbued with the idea, handed down by the fathers of political economy, that there was such a thing as a wage fund; that a certain amount of money or capital was set aside by the capitalists out of which all wages were paid, and while employers might pay less, they could not pay more than the fund contained. The professor came to the rescue with the proposition that if you could only reduce the number of laboring men there would be more money to go around, and wages would be increased! The idea was contagious. It set sections of the world on fire; but it was false. Subsequent history demonstrates that it was absolutely untrue. There never was a time in the history of the world when there were so many laboring men as there are to-day, and there never was a time when their conditions were so good; never a time when a day's labor would purchase more of the necessaries and luxuries of life than to-day. Conditions in the United States at the present moment are more hopeful, more encouraging than they ever were before. We are adjusting ourselves to the new, progressive conditions, and these organizations that are being formed in the United States are, in my judgment, the forerunners of a still greater advancement of the human race. With the prospect of reducing the hours of labor which has really already come, with the actuality of increased wages and other improved terms of employment, the laboring man, and especially the economists of the world, ought to take hope.

Mr. McMackin: I cannot quite agree with my good friend from Illinois that things are just as prosperous and people are just as happy and that everybody is just as well off as my friend says they are in his state. I only wish that it were so, but alas it is not! We gather statistics in New York, and that is what I thought they did in Illinois. We can tell exactly how prosperous we are in our state, and I claim that our prosperity is second to none. We found in the three months ending in March that over twenty-two thousand members of labor organizations were idle a whole quarter, out of 170,000, which means, what? That, if the same ratio held good for all wage-earners there were 220,000 idle in our state, the majority of whom must have been in enforced idleness. I am from a state that has perhaps the best factory laws on any statute book, and perhaps the best

time labor law, and I have to be a witness to the fact that the enforcement of those laws actually means the starvation of the families upon whom they are enforced. I have seen cases where compulsory attendance of children at school meant the breaking up of their families. Is that the kind of prosperity that ought to exist in this country? Is that the kind of prosperity that my friend glories in? If it is, then he has but a very small conception of what are the rights of an American citizen. And if my friend from Michigan talks about depending on the law in connection with it, surely the very evils of which we complain are the results of law. If not law, what is it? Then my friend from Illinois talks of our wonderful progress. Undoubtedly we have progressed, progressed as no other people have in invention and in everything else. But what has invention done to uplift the man on the lower rung of the ladder? What has science done to better the condition of life? Have our wise men, our statesmen done anything to help distribute equally the benefits of these great inventions and all the wealth that comes from our productive capacity? Nothing. I may tell our Christian friends that we have been preaching Christianity, (I claim to be a Christian, a poor one, undoubtedly; but I try to be as good as I can;) and yet with nearly two thousand years of preaching the "Fatherhood of God and the Brotherhood of man," scarcely a single government has in any large degree brought its system or its laws into accord with the rules of Christ for man. Still my friend tells me we are all happy! I wish it were so. We are not. We are building up monster fortunes and creating an immense population of impoverished people, and that is the great curse of our condition to-day.

Now I say these things without any reflection upon our good friend from Illinois or my distinguished friend from Michigan, but rather that the truth may go on these minutes as to the actual condition of the people in the United States.

The President: We have an hour which can be devoted to the routine business of the convention, if that be the wish of the members. But prior to entering upon that our friend from Maine, Mr. Matthews, would like to present to the convention a very distinguished gentleman, simply that you may see him.

Mr. Matthews: Mr. President and Gentlemen of the Convention: I wish to announce that there is with us to-day an ex-United States senator, a contemporary of Clay, Webster and Calhoun, and the sole surviving member of that senate, who, at the great age of ninety-seven years, manifests his interest in our meeting and discussions by his presence here. I wish to introduce to you the Hon. James W. Bradbury of Augusta. (Applause.)

Mr. Bradbury was conducted to a seat by the side of the president and he subsequently addressed the convention as follows:

Gentlemen: I am too old to speak; age impairs my faculties. I understand the questions you have under consideration are most important, and deserving the serious consideration of every thoughtful man. I think we should consider the great questions between capital and labor, and the question of whether our system of education is adapted to fit our citizens for the duties they will be called upon to perform, that they can better fulfil the duties of life. But, gentlemen, these matters are for you. Age prevents my going into their consideration. I thank you for the courtesy you have extended. (Applause.)

President Wright: Governor Merriam, the director of the twelfth census, has kindly sent to this convention one of the members of our association, the Hon. L. G. Powers, one of the chiefs of the statistical census office, thinking that we should all be interested in knowing something of the organization and plans for the twelfth census. It is a matter in which we take a deep interest, as you know, and it is well for us to be informed beforehand of what Governor Merriam hopes to accomplish. Mr. Powers will present the views of Governor Merriam in regard to this matter. I now introduce Mr. Powers who will briefly give us the plans for the twelfth census.

ADDRESS OF MR. POWERS.

Mr. President and Fellow Commissioners: It is a pleasure for me to meet with you this day. It brings back to my mind the many years that I was so pleasantly associated with you as commissioner of labor from Minnesota. I am glad to be with you to renew the old ties of friendship and to make the acquaintance of the more recent appointees in your ranks. I am doubly glad

to have the privilege of presenting to you a brief statement relating to the forthcoming twelfth census of the United States. The census, as you all know, is the most important and extensive branch of statistical work undertaken by the government of the United States, and the census of this nation is, in most respects, more elaborate than that of any other great country on the globe. The census is, in some particulars, related to most of the statistical work undertaken by all of the gentlemen here present. We must have the census statistics of occupations, and of employment, properly to interpret the statistics of wages, which are so frequently tabulated by our bureaus of labor. The census data relating to home ownership bring forward new settings for many of the other facts so painstakingly gathered and presented by these bureaus. Did time permit I might call attention to a multitude of other ways in which as statisticians and as students of economic and of social conditions, you are all interested in the plans and work of the federal census.

Then there is another side to this question. All those charged with the responsibility of bringing this great national enterprise to a successful issue are desirous of securing from this organization, the most prominent group of men in the nation who are engaged in statistical work, their intelligent interest and hearty co-operation. The value of the census depends very largely upon the accuracy of the data as it leaves the hands of the enumerator. That accuracy cannot be secured without a popular interest in the subject and that interest must vary with the attitude toward the census which is displayed by cultivated men engaged in economic and statistical studies such as yours. Were the people, as a whole, thoroughly aroused to the value and importance of our decennial statistical stock-taking, called the census, a great part of the difficulties in the way of making a success of that work must be removed. It is by reason of this fact that Governor Merriam, the director of the census, accepted the very kind invitation of your president and authorized my presence here with you this day. He desires to have presented to this body of statisticians a brief statement of what is being done to give this country a reliable and accurate census at the opening of the twentieth century. And may I add that so far as that work is worthy of your consideration, I bespeak for it your support in the years that are now before us.

In making the brief statement concerning the census which you have so kindly invited me to present, I shall not attempt a general exhibit of all the detailed facts relating thereto. I shall more briefly speak of the things wherein this twelfth census differs from, and wherein it is hoped and believed that it will be superior to, those that have preceded it.

And first I will call your attention to this fact: The twelfth census does not, at the outset, take up more than a portion of the work undertaken by the census of 1880 and 1890. They investigated a wide variety of subjects. They began collecting their data relating to all of those subjects at the same time. More or less confusion followed these efforts by one agency to collect, tabulate, and present data relating to so many subjects at the same time. There was much conflict in the several branches of work and more or less of overlapping and some duplications. Great delay arose in the final tabulation and presentation of the data gathered, and some that was gathered and partially tabulated, at great expense, has never been published and never will be. The people became impatient at this delay in securing information for which they were taxed and demanded a change. They desired a census whose results should be published within a reasonable time after the collection of the data. It was for the purpose of meeting this popular demand that Congress, in making provision for this census, very wisely and properly separated its work into two branches, which are designated as the census and the census extras. The census proper is to consider only four subjects—those relating to population, mortality, manufactures, and agriculture. The law directs that the results secured relating to these branches shall be completed before any of the census extras are begun. It also directs that these subjects shall be completed within two years from the first of next June.

I come here saying that it is the purpose of Governor Merriam and all those associated with him, that the wish of Congress in the last mentioned respect shall be completely realized. All the plans being made at the present time have this end in view, the publication of the final report of the census relating to agriculture, population, manufactures, and mortality, before June 1, 1902.

The organization is being perfected with the idea constantly in view that any object which stands in the way of the realization of

this early completion of the census must give way. If any man at the head of a section, or anywhere down the line, from any reason or cause, delays that completion, he will have to get out and give way to those who can and will be able to reach the goal on time.

The foregoing is one very important fact about the census, which I hope you will keep in mind for the next three years. A second and even more important one is this: In realizing this early completion of the census proper, there is to be no sacrifice or decrease in the reliability attained by any preceding census. On the contrary all engaged in the present work believe that the present organization of the office will permit the early completion of the census, and at the same time give to the people of the United States a better and more reliable presentation of facts than was ever completed in this country.

In saying this I do not wish to be understood as casting any reflection upon anyone connected with any preceding census. Many able men have labored wisely and well in our national census work. We are standing upon their shoulders. We should profit by their work. We cannot be said to do as well as they unless we accomplish more and better results. When we promise the country a better census that the last we simply promise therefor what the country has a right to expect from us as the result of experience in the past. There are many things in the law relating to the twelfth census that will greatly assist in securing those desirable objects. I will speak of a few of them.

I will mention first a feature of the present law, which I am glad to say, the country owes in part at least to the president of this convention, the Hon. Carroll D. Wright. One fault of all the preceding organizations for the purpose of taking the census was the lack of any corps of statisticians or responsible advisors of the man at the head, the superintendent or director. Chiefly upon the advice of Commissioner Wright Congress saw fit to create a body of five chief statisticians and an assistant director, who bear the same relation in their work to the director that the president's cabinet does to the president in his work. Each has a certain section, over which he has charge, for which he is responsible. In their several activities they must co-ordinate

their labors one with another. This feature of the present census is a marked improvement over the condition of affairs that existed ten and twenty years ago. It will secure co-ordination between the work of the several branches of the census, and thus a greater unity than was realized before. Much of the preliminary work now being done is for the purpose of securing this end.

Let me call your attention to one or two phases of this. Those of you who ever examined the subject of farm tenure and compared the data in the volume on agriculture with the statistics of farms and homes in the volumes on Farms, Homes, and Mortgages, have found much variation in the published figures. The questions used in 1890 for the two investigations were framed along different lines, and led to results that were in some respects contradictory, and in all respects more or less confusing. It is true that no census will secure from the inquiries on the population schedule, tabulated results that will be identical with those obtained from the answers to the inquiries on the agricultural schedule relating to farm tenure. The inquiries on the population schedule tabulated in the volume on Homes, Farms, and Mortgages must, of necessity, make the family the basis of investigation. On the agricultural schedule the farm is the basis of all inquiries. This difference in the basis of their investigation will necessitate some variation in the results obtained by the two lines of study; but by a careful effort to bring the preliminary questions and instructions into harmony it is believed that the twelfth census will present reports relating to farm tenancy and to farms, homes, and mortgages which will more fully harmonize with one another and leave fewer variations to be explained than was the case of the eleventh census.

Everywhere that the work of one section or division of the census touches that of another, as in the case last mentioned, there will be an effort through the co-operation of the chief statistician and the assistant director to secure co-ordination and prevent duplications. Permit me to give a further illustration of this phase of our work. Butter and cheese are made on the farm, and thus are among the products to be reported in the volume on agriculture. They are also made in factories and are among the subjects treated in the volume on manufactures. The

chiefs of these two sections must arrange their work so as to secure between them an exhibit of all the butter and cheese produced in the country, and at the same time have no duplication of product or of capital invested. There is a need of a like co-operation in dealing with the sugar, wine, and cider, made in factories or on the farm—of cotton ginned in large corporate establishments and cotton ginned on the plantation. The separation of work by the several divisions above outlined, preventing duplication of effort, will lessen to a certain degree the expense of the census. It will also expedite the work and assist in bringing it to an early completion.

Another new feature of the twelfth census is the building which will shelter its force of employees. The employees in the eleventh census were housed in a number of different buildings, arranged in small rooms like those of the average large office building. The next census will see its employees all under one roof and upon only two floors. It is estimated that the increased efficiency of labor that will be brought about by this change will be more than sufficient to pay the total expense of the rental of the building.

Again I will call your attention to the fact that this census will perfect its organization several months earlier than has ever been realized before. Its preliminary work is something like six months further along at the present time than it was ten years ago. It is intended to push that preliminary work with all possible vigor and by making more thorough and perfect preparation prevent many of the delays and imperfections of all preceding censuses. In this way, as well as by the others already mentioned, it is hoped to secure greater expedition in the final tabulation and publication of the census work.

This early organization of this preliminary work is only one of many efforts being put forth to improve our census statistics. Those statistics depend for their accuracy, as I stated at the outset, upon the correctness of the returns made by the enumerators. In this census, as in all that have preceded it, the enumerators will come to their work, as a whole, without any previous experience in the work to be undertaken. In the tenth and eleventh census those enumerators did not know of their appointment but a few days, and in many cases but a few hours, before they began their work. The great majority of those in the agricultural sec-

tions never met a superior officer to talk over their duties. They had to depend, for their guidance, upon a book of instructions put into their hands a few hours or days before they began their work. Many of the supervisors were but a little better instructed in their duties. They were appointed only thirty to ninety days before the active work of the census began. Is it any wonder that so much of the data gathered by the enumerators had to be sent back for correction? And it is not to be doubted that many a gross error thus crept into the work as finally tabulated and published. I mention this fact not to cast any odium upon any person in any position in the eleventh census. I believe that with rare exceptions all of them did the best they could under the circumstances in which they were placed. Nothing different could have been done with the late organization of the work of the supervisor and of the central office.

I can now make clear, I trust, the importance and significance of the early organization of the census, to which I have already alluded. The supervisors, for nearly all parts of the nation, have already been selected. They will have nearly a year in which to learn and become familiar with the duties, where their predecessors ten years ago had two or three, or at the most, six months. The work of arranging the enumeration districts and of apportioning the enumerators has already begun, and will be completed six months earlier than ever before. After that work is completed it is now contemplated to begin the work of carefully training the supervisors and enumerators in their duties in a way that was never attempted before. The printed and written instructions furnished ten years ago will be in the hands of the supervisors and enumerators as many months as it averaged days at that time. Further, so far as it is found practical, every supervisor in the country will be brought in personal touch with those in the census office in Washington and given practical training in the work of census taking. He will be shown in detail the work of the enumerator, as well as that of his own. In the same way, so far as practical, the enumerator will be brought in personal contact with the supervisor over him, and thus, as well as by the printed page, shown how to discharge the duties which he assumes in connection with the census. This training of the supervisors and enumerators by all the practical

methods that can be arranged for in the six months extra, which have been secured by the earlier organization, will, I feel very sure, result in obtaining a better class of work on the part of the enumerators, the very source of all our census information. It cannot fail to give us a better census than was ever realized before. In this I know you will agree with me after your own practical experience in collecting statistics.

Not only is this training and preliminary work required to secure a good census, but good men are also needed for enumerators. The best of training by the census officials at Washington cannot make census brick without the straw of good men as enumerators. We need these men as enumerators. We need, therefore, the influence of every man in the country who appreciates the value of good statistics to bring a pressure to bear upon all concerned in our several communities in order that only good men be appointed as enumerators. Here, then, is a place where you gentlemen, as statisticians, as men interested in honest, faithful, and exact work, can assist the census officials. You can make your influence felt in your several localities, with your local supervisors and congressmen, in demanding that only good men be appointed as enumerators.

I have already mentioned the fact that the law calls for, and the officials in charge intend that the census shall be completed within two years. To accomplish this end competent clerks must be provided in Washington. The clerks thus far appointed, as the result of the examination already held, are of a very high order. I believe that they are the equals, if not the superiors, of the employees in any other branch of the public service at our national capital, or in our state government. We need but to have the same grade of appointees in the future to make of this twelfth census a model civil service for the nation.

I will touch upon one point further, and then I will close. I have been asked by many this question: Is the census a permanent institution? Is it to be made a permanent department of the national government? I will answer: Under the law, no. The country asks for a permanent census, but I believe that the country asks still more for a good census, a census that will meet certain ends. Congress has not made the census a permanent institution, and it will not until it knows whether the men in

charge of it can give the country that kind of a census which the country demands. If the census officers are able to bring about in two years from next June, the time called for by law, the completion of these four fundamental departments of work, and do it in an efficient manner, this department will, in my opinion, be made permanent. If they are not I don't believe it will be permanent. There will be a new deal made in ten years. I believe those connected with the work appreciate this fact. I believe that Governor Merriam is the man to bring all the forces into line that shall give the country the best census that it has ever had, a census such as the country asks for that will meet the requirements of the students of practical statistics, such as are here gathered, and that thus will be laid the foundation for that which you have asked in the past, that which we all desire, a permanent census department.

I thank you for your attention, and bespeak from all of you your co-operation in the work of the twelfth census, in making it that which we all desire, that which will be an exact exhibit of the resources of the United States, of the national population and of all the facts which we seek to obtain by this decennial stock-taking of our people. Again I thank you. (Applause.)

The President: I have the pleasure of presenting to you a gentleman who is secretary of internal affairs of Pennsylvania, a member of our association and *ex-officio* at the head of the work of the bureau of statistics in his own state. He will address you on "Are Economics of Value in the Philippines," General James W. Latta.

ADDRESS OF GENERAL LATTA.

Mr. Chairman: A saving, thrifty household is an economic household; a saving, thrifty nation is an economic nation. The widening scope of economy reaches beyond its domestic family environment, includes the state, and finds comprehensive expression through the qualifying word, political. Between political economy and sociology there is close relationship, and with them both Democracy has established a substantial intimacy. The mission of Democracy is to break down caste, strengthen the family unit, enlarge the opportunity of the individual. Caste primarily of oriental significance has occidental application, where hereditary preferment is the distinctive social feature. It

stands for the "dangerous aristocracy" that the unduly alarmed patriot feared that those equally earnest in patriotism, but of alleged aristocratic tendencies and formidable in the wisdom of state craft, had purposed to visit upon the republic in the formative period of its existence.

Caste seriously impairs the basic principle of Democracy, equality before the law. But Democracy has more than fulfilled its purpose, its potent influences have not been confined to the geographical limits of its own domain. Our forbears aimed to secure for it no wider scope. Narrowed to a little fringe of free republics along the Atlantic seaboard, Democracy was indeed a tentative undertaking. It was disassociated from every form of government, Asiatic and European, and out of fellowship with powers, potentates, and rulers, insular and continental. A hundred years have come and gone; the strength of the potentate has diminished; the power of the republic has increased. Experimental Democracy is now substantial Democracy, and the United States of America, where all color is alike, all creeds are equal, is the significant exponent of the peoples' sway.

Democracy is paramount in the western world, extends its touch to distant Africa, supplants an old Bourbon dynasty with the flag of the French republic, and still maintains itself triumphantly in the mountain cantons of Switzerland. Parliament, Diet, Cortes, Reichstag stands for the people in every court of Continental Europe; Islam and Slavic rule only are absolute, whilst every subject of the realm in all her Majesty's vast dominions proudly proclaims himself a free-born Englishman. Equality before the law, if such, in fact, were not its first conception, has enlarged itself to the equality of privilege, the equality of opportunity, the equality of ability.

Democracy accepts a new responsibility. It enters upon another tentative era. It proposes to assume the "white man's burden." Is it as fitted to regenerate the savage in distant lands, to direct an untutored civilization, to control colonial possessions as it is to be mandatory in an "indestructible union of indestructible states." The right of territorial acquisition of contiguous boundaries was determined by the Louisiana purchase. The stricken political conscience of the strict constructionist yielded its constitutional convictions to an opportunity too advantageous to be

neglected. Sovereignty is a sweeping concession. The right to declare war, to wage war must confer the corresponding right to accept the responsibilities, adjust the differences, to solve the conclusions involved in the consequences of war.

Will economies be helpful, sociology of value, statistics of advantage to this enlarged purpose of Democracy? Are their principles applicable, their aims available for the conditions prevalent in our new possessions? In the Philippines statistical information seems to have been limited to the market quotations, the custom-house manifest, and the readings of the thermometer in the city of Manila, meagre details for helpful economic aid. The economic arts have no abiding place until the social compact has broadened to a national existence. The economist has no tools in his workshop to fashion betterments for a primitive people unwilling to abandon the tribal relation and accept the state as the institution of right. Nor even then are his implements adjustable for a people who fail in the possession of a national conscience. The knowledge of the right and the wrong of it acquired through a pagan civilization is a sterile domain for the propagation of a thrifty economic harvest. The failure of the Englishman to realize the full fruits of his labor in his oriental undertakings is because of the unregenerate millions who people his vast East Indian possessions. Almost fifty years ago John Bright said of India, "Educate the people, govern them wisely, and gradually the distinctions of caste will disappear." Neither wisdom of administration nor offers of a beneficent training have fulfilled the assurance. Wedded to caste, true to the traditions of an idolatrous priesthood, the East Indiaman declines advice to be frugal in years of plenty. Famine is his direst foe, yet he refuses to be provident in methods and measures to alleviate the miseries or avert the depopulation that follow its stalking ghost so often abroad in a land so abundant in sunshine that if wanton drought did not at times assail it, it would be ever the richest of man's belongings. "Enlightened government and modern civilization: these are the specifics for famine. Where they exist scarcity will never result in depopulation. Where they do not, the utmost endeavors of government may mitigate, but they cannot avert." (Hunter's Annals of Rural Bengal, p. 55.) Great epidemics originate beyond the borders of christen-

dom; within its limits famine is rare and pestilence infrequent. Caste is the formidable hindrance to the complete reclamation of a Hindu civilization to the white man's standard. Willing to accept a western sovereignty, unwilling to yield to its proffered education, the enfeebled Hindu mind clings vigorously to an hereditary philosophy that blights personality, impedes progress, destroys usefulness. The Hindu has no fear of disturbance in his religion. Save that he has been halted in his cruel sacrifices, his faith is guaranteed him. The empress of all the Indies has assured him by official proclamation that the state shall in no way interfere with his creed.

This tenacity of religious purpose in these worshipers of strange gods is not limited to the boundaries of the East Indian peninsula. A pagan civilization grown up about an idolatrous devotion is resentful of interference. The savage seems more willing to surrender his fetish than does the pagan his philosophy. Stunted moralities, the survival of fetish beliefs and pagan practices are barriers that will clog the humanities in an early redemption of the Philippines. In scientific research and intelligent travel no American has better acquaintance with that archipelago than Professor Dean C. Worcester, of the Michigan University. In his recently published work he says, "The total population of the archipelago is not definitely known, as census returns are necessarily inaccurate, but it is usually estimated at from eight to ten millions. It is divided between more than eighty distinct tribes, which, for purposes of discussion, may be conveniently grouped as Negritos, Mohammedan Malays, pagan Malays, and civilized Malays." And this is his judgment of one of these numerous tribal subdivisions: "I have elsewhere given in some detail my estimate of the Mohammedan Malays or Moors. I consider it certain that the nation which would have any hope of getting on peaceably with them *must let their religion strictly alone;* certain, too, that for many years to come they must be held in check with a strong hand."

Mr. John Foreman, of the Royal Geographical Society, in his instructive work on the Philippines, a London publication of 1890, thus measures the domesticated natives of Luzon, the Filipinos: "Amongst themselves they are tyrannical. They have no real sentiment, honor or magnanimity, and apart from their

hospitality, in which they far excel the European, in all their actions, they appear to be only guided by fear or interest, or both." * * * "No one who has lived in the colony for years would sketch the real moral portrait of virtues and vices." * * * "Nor do the natives, rich or poor, of any class in life, and with very few exceptions in the whole population, appear to regard lying as a sin, but rather as a legitimate, though cunning convenience, which should be resorted to whenever it will serve a purpose. It is my frank opinion that they do not in their consciences hold lying to be a fault in any degree."

Professor Worcester confirms this estimate in language equally convincing. "The civilized natives," he says, "seldom voluntarily confess faults, and often lie most unconsciously to conceal some trivial shortcoming. In fact, they frequently lie without any excuse whatever, unless it be the aesthetic satisfaction derived from the exercise of their remarkable talent in this direction. When one of them is detected in a falsehood, he is simply chagrined that his performance was not more creditably carried out. He feels no sense of moral guilt, and cannot understand being punished for what is not, to his mind, an offence."

A recent magazine article quotes from an undisclosed authority as follows: "A student who spent fifty years here (Manila) is quoted as saying, 'The native is an incomprehensible phenomenon, the mainspring of whose thought and guiding motive of whose action has never yet been, may never be, discovered.' While General Otis, in response to an interviewer, who inquired whether his idea concerning the native character had changed since the recent outbreak, replied, 'No one understands the native character.' "

These estimates of native moralities would indicate that the Filipino "is lost to that veracity of mind so essential, as Carlisle has pointed out, to the successful existence of men and nations." A basis so deficient in the social virtues offers but a flimsy superstructure upon which to construct a conscience trustworthy for the maintenance of international obligations consequent upon independent statehood; presents an insecure foundation for economic development and industrial growth.

Goldwin Smith resolves the elements of human progress, and thus, as he phrases it, of universal history, into only three—"the

moral, the intellectual, the productive." And Herbert Spencer, associating the same thought with the effect of population upon these portions of the earth's surface capable of sustaining it, says: "After having caused, as it (population) ultimately must, the due peopling of the globe and the raising of all its habitable parts into the highest state of culture; after having brought all processes for the satisfaction of human wants to perfection; after having at the same time developed the intellect into complete competency for its work and the feeling into complete fitness for social life, the pressure of population must gradually bring itself to an end."

Is the Philippine archipelago one of the habitable parts of the globe likely to be raised to the highest state of culture? It answers responsively to the pressure of population. The area of the island of Luzon alone more than equals in extent the state of Pennsylvania, while its estimated population is not far short of the number of inhabitants in that favored commonwealth. Are the racial conditions an insuperable barrier to intellectual development, moral progress, a complete fitness for modern social life? There is probably no territory of equal extent where savagery, barbarism, and civilization are severally in such significant evidence. As John Fiske designates it, "Barbarism is the enormous interval which begins with the invention of pottery and ends with the invention of the alphabet." Civilization consequently beginning with the invention of the alphabet, according to the French philosophers, exists in various degrees and is susceptible of continual progress. The savage "is an uncivilized human being, one in the lowest and most primitive state of society." Luzon savagery is not of the worst, its barbarity not the most offensive, nor is its civilization of the purest. The combination would embarrass the idealist, the situation stagger the reformer. To treat the question superficially, there could be but the one conclusion—to sacrifice philosophy, forego morals, and let the Filipino take care of his own deliverance. There is, however, one of Goldwin Smith's three subdivisions so available in these islands for the application of economic principles that, with its better development, the higher development of the other two might follow as a fitting sequence. There is no soil of more productive affluence within the zone of the tropics than that of

this archipelago. The people have shown a capability of applying the industrial arts to the fabrication of much of this affluent product. With intelligent guidance this fabrication might be utilized to high commercial advantage.

There are physical hindrances. Never to worry and not to work are coincidents of tropical temperament. All nations begin by being agricultural; but, with a soil so prolific as to yield without assistance a sufficient sustenance, there is no incentive to labor. The morrow takes care of itself. Neither is there invitation to an Anglo-Saxon emigration. The benefits the native may derive from an acquaintance with Anglo-Saxon enterprise can come only from the touch he is permitted to enjoy with Anglo-Saxon methods. No white man can discharge his daily toil under the withering influence of a tropical sun, except he be of a Latin race. There is no need longer, either, to find a home for conscience' sake. A universal tolerance has stayed the flight from persecution. The intellectual and the moral in proper ethical order precede the industrial development. The Pilgrim and the Puritan, Cavalier, Scotch-Irishman, Quaker and Huguenot, recognize the precedence, and each landed upon the shores of his new American home with the Bible and concordance in one hand, the arithmetic and spelling-book in the other. As they tore the rocks asunder in New England, leveled the primitive forests in the Appalachian basin, found a more beautiful yield in the Savannahs of the south-land, they overcame all natural resistance and found advantage and opportunity in their every undertaking. But they never forgot the ethical precedents. Their beliefs and their scholarships kept pace with their opportunities. They met their dangers with their fortitude, surmounted their difficulties with their energies, and, while learned theologians gave them better understanding of their creed and encouraged wider dissemination of their faith, they found in their belles-lettres, rhetoric, and mathematics a higher intellectuality than was supplied them in their primer and arithmetic.

Why may not climatic and social conditions justify a reversal of the sequence and an intelligent morality be constructed from a proper industrial foundation? Why may not a neglected and abandoned people, inhabitants of a land of wondrous abundance,

have their production so intelligently directed that they may be ultimately willing to accept the ethics of Christendom, attain a public conscience, be trained to the responsibilities of state craft? The native's preference would probably be to be governed well and let strictly alone as long as he obeys the law. It is said he has no patriotism, in the sense of the white man's understanding. But the North American Indian had no patriotism, except as crude savagery was an incentive to its development; yet he held tenaciously to his exclusive right to the occupancy of the country over which he roamed, and fought viciously against intrusion on or seizure of his vast nomadic belongings. Yielding to the inevitable, after years of bitter conflict, where he still insists on maintaining his tribal relations, he at least contents himself on his reservation; or, willing to abandon those relations, finds still better satisfaction in his fee simple title to the holdings the government has allotted him. He was slow to accept this, the first step of civilization towards personal betterment. So, too, may it be with the Talogal peasant. His Spanish master never taught him the advantage of proprietorship. He was sometimes permitted, when one piece of property was inconvenient of tillage, to wander to another better suited to serve his purpose. If the responsibility of his American protectorate shall be to locate him on his belongings, assure him against intrusion, secure him against ouster, he may learn to know that land ownership strengthens the family unit as the stable beginning of the social compact.

Nor did the Spaniards wholly fail to recognize proprietorship as a civilizing initiative. They made at least one attempt at land allotment. A better selection for the test could have been secured from among the domesticated natives. Instead, however, a wild tribe of mountain nomads was chosen for the experiment. Holdings were set apart, stock supplied, and implements furnished, but within a year the lands were all abandoned and the tribe was back again to its home in the mountains. The fact that the best available lands are held largely by the monastic element, either through undisturbed possession or government grant, with domesticated natives as tenants, may have restricted the test to a location and people least likely to support it.

An eminent writer on economics, Professor Arthur Latham Perry, substituting value for wealth as a word of higher technical significance, says: "The three only valuables are, in short, material commodities, personal services, and commercial credits." The Luzon native, as with the vast majority of the species everywhere, regardless of race or surroundings, makes his contribution to productivity, entirely almost, through the one direction—personal services. If his wants are confined to the little apparel a tropical environment demands, and his desires are limited to the little food these softer climes require, his contributions will be proportionably lessened. Some incentive to increase his wants and multiply his desires would follow, if beyond his needs for personal consumption the product of his service could be safely called his own. If his labor could be associated with land to which he might justly claim proprietorship, he would be made to understand that his surplus commodities were the subject of barter and exchange for other commodities essential to his other wants and his other desires that his touch with his neighbors, themselves proprietors, would necessarily create. He would soon learn to know that a body politic, so constructed, allied to the commercial centers, would possess advantages and opportunities with which before he had no acquaintance.

Under his Spanish dominancy the domesticated native has been seriously restrained. Besides a burdensome taxation, under the vicious system permitted by the authorities a landlord owned everything but the native himself. Himself he could remove, but not so his belongings. The betterments and accumulations followed the land and the tenant's interest in them ceased when he changed his locality. His lease, too, was frequently so cunningly drafted, the metes and bounds of his holdings so indefinitely set out, that another occupant more favored by the proprietor had sometimes forcibly ejected him before his tenure had run its course.

All nations, as has been said, begin with agriculture. So far as its immature developments have advantaged its units, the social compact in the Philippines is scarce beyond its beginning. Through all the centuries of this improvident beginning, the masses of the natives have so far assisted solely by the contribution of personal services. As a fact, the native knows no more

of economics as an art than did England after the plague in London. Labor woefully diminished in supply, met the demand for its employment by fixing rates commensurate with the diminution. The Parliament, as yet unacquainted with the inexorable law of supply and demand, sought to limit the wage to the prices prevailing before the depletion. The attempt was a failure, the law of the realm yielded to the law of economics, and the wage-earner's bargain was made upon the conditions of the market.

Practically, therefore, at the beginning of his national existence, at least of such a national existence from which he may fairly anticipate substantial benefit, if beside his personal services, the valuable which no man is really without, the native could be permitted the acquisition of landed interest, he would speedily begin acquaintanceship with another of the valuables—material commodities. And though his touch with the commercial credits may be yet afar, if encouragement be given to this, his first introduction to the material community, he is making closer acquaintance with commerce and its credits than he ever had opportunity to do under the old regime. While the commodity is an essential to the commercial credit, the personal service is but the incident of the one and the adjunct of the other. The intimacy of the two former is closer than that of the latter with either of the other two. It is of remote origin, and land, of all the material commodities, is first recorded as a subject for exchange. Two thousand years before the Christian era dawned, Abraham, as an eminent economic writer cites it from the Scriptures, bought the field and cave of Machpelah for four hundred shekels of silver, current money with the merchant.

Biblical authority is silent as to the nature of the title Abraham acquired, whether the grant was in fee or an easement of sepulchre only. The possession assured to him with such public formality "in the audience of the sons of Heth" would indicate that his title was indefeasible. He dedicated his purchase, however, to purposes of burial only—a gruesome beginning in far-off Hebron of the world's real estate movement.

Sentiment has no place in the hard science of buying and selling. It takes two to make a bargain. The meeting of the two minds consummates the contract, each to do what he has agreed

to do without diminution, without evasion. Common honesty is alone the ethical basis of the transaction. There is some sentiment, though, that follows the soil. It is one of God's free gifts to man—not to foster indolence or propitiate sloth, for with the gift has gone forth the edict, "In the sweat of thy face shalt thou eat bread." Public policy is no stranger to the purpose that seeks, through a unity of title in labor and in land, a surer national stability. The new and the old world have both been liberal in their invitation to individual occupancy—the one to encourage emigration, the other to restrain it. The homestead laws of our own country opened our vast western domain to the thrifty and adventurous pioneer; while now Holland seeks to check the appreciable depletion of her population by the reclamation of that portion of the soil covered by the Zuyder Zee most profitable for agriculture and dispose of it to individual purchasers only. It is a gigantic undertaking, attended with enormous cost. That the scheme may be the more effective as an anti-emigration measure, the acquisition of title by trusts and corporations is specifically forbidden, and the prices per acre are made attractively low. Indeed, if the government is likely to pursue the same liberal policy with its colonial possessions as it has with its territories, and encourage Filipino settlement with a land allotment, the white man may seek to be an active competitor in the distribution. An officer on duty in the Philippines, watchful of opportunities, in homely but cogent phrase, not only sustains the economics of the proposition, but observantly forecasts the outcome of the situation. In a letter that found its way to the public prints, he says: "I take no stock in the cry that white men cannot work in the tropics. They can, when working for themselves."

Two recent writers, in contributions to current magazine literature, with a philosophy that deserves a better preservation, seek through the subjects upon which they respectively treat to impress upon their readers the conclusion that the "altogether good" is unattainable both by men and by nations.

Of mankind, says one: "The human heart is a strange compound of good and evil—the proportions are unknown even to ourselves; but one thing we may know with certainty—no human being is altogether good or altogether bad."

And of nations, says the other: "It happens that 'in the corrupted currents of this world' it is impossible for men or for nations in all their conduct to be governed by strict abstract right."

The estimates of the native character have heretofore been valueless. As has been said, the attempt at estimation is a fruitless undertaking. The application of this philosophy to the negative conclusion drawn on the native's better side would probably grade him in that class of human beings not altogether bad. His glaring fault is that he will lie. He is vacillating, uncertain, unreliable. He cannot be depended upon to follow a fixed vocation. While fitting himself for an intellectual pursuit, he is as likely to abandon his purpose for menial service as he is to continue his training. "Situations create duties." No situation has ever been created for him where it was clearly demonstrated that he owed either to himself or society a duty to maintain it. If he shall sow and reap and exchange and barter, with the personal independence incident to proprietorship, there is at once a creation of duties to himself and his fellow-man clearly manifest in the very situation itself. There are "cheery notes," though, in all this "chorus of disparagement." The Filipino is apt with the loom and the spindle; there is a sunny side to his nature; he delights in music. Filth and intemperance are the besetting evils of the undeveloped races. The hurtful ills of intemperance have been a pernicious barrier to civilizing influences. The depravity that follows it is still in many localities a potent hindrance to a better advancement. The Filipino is free, entirely free, from both these evils. He is sober and cleanly. Free from the irritation and despondency of intoxication, he is patient and forbearing. In his cleanliness of person, he is a model; in the neatness of his household, a pattern. Civilization belongs by origin and nature to the sterner climes. It is there found in its better maturity. In the tropics, with the native races at least, it is "an exotic." It must be nurtured tenderly, developed prudently.

The Dutchman has been thrifty as an emigrant, successful as a colonizer. His aim was economics. His only politics were the politics that assured his acquisitions. If the betterments of civilization came of his occupancy, they followed as an incident,

not as the intent of his mission. As an emigrant, he fled from Spanish persecution, settled in southeastern England, and, teaching the English artisan new lessons in craftsmanship, impelled the British nation to the higher attainment of its best industrial development. As a colonizer, he took Java, with her 52,000 square miles of undeveloped soil and her 5,000,000 semi-barbarous people, and with his so-called "culture system" in less than half a century increased the population 73 per cent. and made the island a garden spot of vast "exquisite beauty," "the finest and most interesting" in all the tropical zones. He opened schools in the most populous districts, but forbade his priests and clergy to proselyte the native. His "culture system" was realistic nationalism long before the exposition of the new philosophy. The native tills the soil, the government takes the product, and the profits are shared between them.

The recent experience of a traveler of reputation in far-off eastern Asia is illustrative of the fact that, with all our nineteenth century progress, we are still abreast with the rural simplicity of pentateuchal times. In the lengthy journey from Pekin to St. Petersburg he thus cleverly describes the change as he crosses the Mongolian-Siberian frontier: "Although their land was richer, the people seemed less well-to-do. Their tents were smaller and poorer. They seemed to be more eager for money, more on the outlook for 'tips,' less ceremoniously polite. In a word, we had passed from a nomadic and pastoral people, content with their flocks and indifferent to money, and were among a people so much in touch with civilization that they knew they were poor." They were disturbed by the debasement of penury, but not yet awakened to the refinement that rejects the proffer of the unwilling gratuity. Their perceptions were quickened by a new presence that supplied the satisfaction of desires with which, in their more primitive state, they were wholly unacquainted. Their rude speech and coarse life had not prepared them for the self-dependence of personal energy. They had not yet learned that mendicancy is repulsive to manliness, that poverty has its dignity as well as riches. An equally crude acceptance of Christianity pervades the heathen border line. A first acquaintance with the forms of worship is not always accompanied with a proper spirituality, and when it is sought to

exhibit proficiency the missionaries tell us that it is sometimes with difficulty that they suppress the convert's demand for tobacco before, as the convert styles it, he will furnish his hallelujah. The Philippine Islanders are largely a nomadic people. They may not know that they are poor. They will when they touch American civilization and begin to know American ways. Where there are landed estates, they are large and their titles not wholly secure. Most of the land seems to be practically vacant and awaits pre-emption.

Money a thing of value, a medium of exchange, is as well a solvent. Its introduction supplied the first method for distribution. Until a standard was devised for the determination of value, wealth was incapable of measurement. The flocks and herds and lands and possessions stood for themselves alone. They were substances of intrinsic worth, but with no calculable value. Their possessor was at the same time a rich man and a man of station; with his wealth was his influence; with his station, his authority. There were no middle classes; it was riches for the few, poverty for the many. The poor were held to service, dominated by the authority, awed by the possessions of the rich. There was no way to distribute the lordly holdings of the master until something of representative value was invented into which these holdings might be ultimately converted. The poor man could have no hope or expectancy of like enjoyments with the rich; the estates were too vast, the leap was too great, there were no steps of gradual approach. What was to be the medium, the intervention of which would permit their acquisition in lesser proportions, where the possessor of the medium did not control it in sufficient volume to secure the whole? Abraham applied the first practical test when he converted a surplus from his vast Egyptian proprietorship into money and then invested that money in a real estate operation in distant Hebron.

It was "one of the initial steps in the progress of civilization" when "money current with the merchant" was devised as the expedient to relieve the difficulties and remove the hindrances incident to the direct exchange of services or materials, each for each, or the one for the other. Its earliest functions were to break bulk, to expand trade, to save time, to eliminate distance, to equalize commodity balances. It encouraged association,

engendered confidence, relieved the feebleness of isolation, awakened a sense of personal dignity, strengthened individuality.

The fulfillment of all these intentments in our new possessions, though distant, is yet attainable. Only the domesticated natives know of money and its purpose. Mexican silver, the currency of the commercial centres, does not invite confidence. Its value fluctuates. Too bulky for convenient carriage, it has encouraged a pernicious system of small credits, that frequently involve serious losses. Counterfeit coin is plentiful. Good money, the mutual confidences of commerce, the independence of land proprietorship, are sterling factors upon which the economic evolution of the Philippines must eventually be dependent.

Christianity, the hand-maiden of civilization, is confined to the few, and, filtered as it has been through a debased priesthood before it has reached its converts, it will afford but little succor towards the leaven of the unregenerate masses. Policy, propriety, safety, forbid interference with pagan practices, heathen beliefs, the worship of false gods. The commissioners have guaranteed immunity. Intelligence, integrity, capacity, have been hindered rather than encouraged through the centuries of touch the Filipino has maintained with his Latin ruler. Only a long and acceptable acquaintance with the Anglo-Saxon and his methods can accomplish for the natives of the Philippine archipelago what they are manifestly unfitted to accomplish for themselves.

In a recent communication to the Navy Department, Admiral Dewey concisely and intelligently epitomizes the situation. "Although," says the Admiral, as he concludes his report, "under the rule of the United States, the character of the natives will certainly improve, a sudden change is not to be expected. A few of them might be employed on transports and vessels of that kind; indeed, the Filipino quartermasters who have been serving on the Nanshan and Zafiro since the purchase of those vessels have always been satisfactory, but because of their long association with Americans and Englishmen they belong to a class apart from the great majority."

The unconscious tribute of the Admiral to the fruitfulness of Anglo-Saxon association inspires a hopefulness that that associa-

tion will solve the problem of Philippine regeneration. The efficacious results of the long familiarity of the small minority with an American and English opportunity must be equally beneficial when a like propitious advantage is afforded the great majority. The successful ministration of the economic sciences only awaits closer intimacy and wider dissemination.

ADDRESS OF COL. WRIGHT.

United States Industrial Commission.

Gentlemen of the Convention,—The United States Industrial Commission is a logical outgrowth of the custom of modern legislatures and the theory on which they conduct their business. No legislature at present can secure the facts which it needs on which to base its legislation, or evidence for the consideration of current questions. It is obliged to commit all such questions to committees of its own organization and creation. Hence the principal work of modern legislatures is done by committees, who study bills referred to them, ascertain the facts along the lines of each matter, and make such report as in their wisdom, derived from the collection of data, opinions, etc., they see fit. Now, this work has gone so far, under the complications of modern civilization and the complications arising out of industrialism as compared with militarism, that committees thus appointed perform the work of the legislatures. Legislatures have neither the time, the force, nor the organization competent to collect the data necessary for wise conclusions. So modern legislatures, in addition to their own committees, have established by law various commissions for the very purpose of collecting information on which the legislatures themselves shall base their action. The railroad commissions, the boards of State charities, the insurance commissions—everything of that kind belongs to this theory of modern legislation. They are permanent bodies or commissions to which are committed the identical affairs described in the laws creating them, and they are empowered to collect the information to guide the work under them in such a way that legislatures may receive the greatest benefit from their labors. This is the modern theory of legislation. Our own

offices, gentlemen, are in accordance with this theory. The bureaus of statistics of labor, the census—all such organizations are created for the very purpose of collecting information for the guidance and the information of the legislatures themselves. If it were not so, there would probably be no legitimate reason for the existence of these offices, unless the government consider them, as I always have, a part of the educational service of the States. The United States government expends on the average about $8,000,000 a year and employs nearly 4,000 people in purely scientific or educational work, which has no bearing and no influence upon executive administration. It is authorized by the Constitution in that clause which empowers Congress to provide for the general welfare of the people. Hence the creation by Congress—and this provision is duplicated in most of the State Constitutions—of these offices, commissions, whatever you please. Legislatures cannot properly perform the duties pertaining to their office without the information which all these commissions bring to their service.

The United States Industrial Commission finds its reasons for existence in this modern theory of legislation. Congress cannot undertake through its single committee of labor and education in the Senate and of labor in the House to weigh carefully all of the facts and conditions surrounding the industrial features of the people and under such consideration arrive at any solution of the problems which they are in duty bound to help solve, even if they cannot solve it. No legislature, no people, no community, is expected to solve all of the difficulties which arise out of the industrial situation or of social conditions. But it is the duty of every legislature and the duty of every people and of every community to try. But before any effective trial can be made there must be information which can be relied upon.

The Industrial Commission has been organized for the very purpose, and for the sole purpose, of suggesting or recommending to Congress and to the various States such legislation as it shall find necessary or feasible for the benefit of the people at large in their general industrial and trade relations. The very first section of the law, which was approved in June, 1898, as described by the Commission itself, states the purpose as follows: The purpose of this Commission, as must be inferred from the

wording of the law creating it, is to "ascertain the nature of the existing legislation of the several States of the United States bearing upon industrial conditions, the material operation of that legislation in its relation to the workingman and the manufacturer and the business man, and to the consumer; the character and effects of similar legislation in foreign countries, and how far it is applicable or desirable in the United States; and what legislation, if any, along new lines is practical or desirable for the improvement of industrial conditions, with a view of determining how far it is possible to frame uniform industrial laws, the adoption of which can be recommended to Congress and to the legislatures of the several States." That is as far as the Industrial Commission can go.

It is not the purpose of this Commission to undertake the collection of data or information from original sources. It intends to utilize all the facts which have been collected by such offices as we represent, and such information as it can gain from foreign countries bearing upon the very propositions which they have to consider. Hence the relation of this association, or rather of the various offices represented here, becomes one of vital importance in the work of the Industrial Commission of the United States.

This Commission has followed the precedents set by foreign countries. In Great Britain there was the great Industrial Commission presided over by the Duke of Devonshire. The results of their work consist of nearly fifty-six volumes, as I recollect it. Their recommendations, however, have never amounted to much, except in two directions—first, in the establishing of a department of labor, organized along the lines of those familiar to the people of the United States, and the modification and extension of the features or provisions of employers' liability acts of Great Britain. This great commission, after sitting several years and examining carefully the laws and the working of them in different countries, were unable to offer any specific solution of the great difficulties which surround those engaged in production in that great country. Belgium has had its commission of labor, created by royal order, in 1886, the Superior Council of Labor. France has an office of the same character. And the duties of these three offices, in England, France, and Belgium, are practically identical with those of the United States Commission.

The ideal on which this Commission was organized was that it might result in the formulation of what its father called an "industrial code"—a code of laws relating to labor and capital which should be applicable in all parts of the United States alike. Now here is a contract which no Congress can carry out and no commission can meet. We see in the different States uneven conditions of law. For many years you know that commissions appointed by different States have been trying to unify the divorce law of the country. There is great disparity in the laws relating to the collection of debts. As pointed out by Professor Rogers yesterday, there is a still greater disparity, and almost a criminal one, relative to the incorporation of bodies for the purpose of conducting business enterprises. And so along various lines there is found this great disparity resulting from natural causes, and not until the industrial conditions of the United States are fairly equal to the economic needs of the people, practically uniform, can there be any general legislative code relating to industrial matters. But the Industrial Commission will make the attempt along certain lines. It will be obliged to abandon the ideal on which the Commission was organized, but in abandoning that ideal it can take up a few practical issues and recommend some legislation both to Congress and to the several States.

The chief weakness of the Commission consists in its organization. Curiously enough, it is organized in this way: It consists of nineteen members, five of whom are appointed by the Speaker of the House of Representatives from members of the House; five from the Senate by the President of the Senate from the members of the Senate, making ten legislative members; and nine, a minority, are selected by the President himself, confirmed by the Senate, these nine representing different industries and different features of labor, coming some of them from the class of manufactures and some from labor organizations. Now this weakness consists in this: That a commission organized for the express purpose of making recommendations to Congress cannot adopt a single conclusion except by the vote of some of the members of Congress itself. Hence these nine independent members are entirely, in their conclusions and their suggestions and recommendations, at the mercy of members of the very body to whom they are to make their recommendations. This, to my

mind, is a very great source of weakness in the organization of the Industrial Commission, and in the end will probably defeat any explicit or valuable recommendation; because when you take nineteen men, representing various parties and various interests, and expect them to agree upon a bill to be recommended for any specific purpose of industrial affairs, the expectation itself will fail. If you should find even that the nine presidential members were agreed upon certain measures to be recommended, they would run up against the obstacle of the legislative members, who could, if they pleased, defeat any recommendation.

The Commission itself in its personnel is fairly constructive. In all probability the members could have been better selected. That is true of every organization. But it must be remembered that, so far as the President is concerned, he was limited in the law to certain elements of the population from which to draw his representatives; and, further, that there was no particular inducement for men to accept his appointments. Nevertheless, with those objections, he has been fairly successful in putting into that Commission a body of men whom I believe to be, on the whole, men of integrity, of foresight, and of willingness, each to waive some of his own predilections for the sake of harmonious work of the whole Commission.

The Commission is organized into several sub-commissions—one on agriculture, one on manufactures and general business, one on mining industry, and one on transportation. Each of these sub-commissions are industriously at work in collecting information, or rather opinions, and in collating the great body of facts which are at their hands for the purpose of making recommendations to the general Commission.

Now what can this Commission do, problematically? This is the great question. Is there any good to come out of its work? What features can it take up practically? It will have a mass of information which will make a library of itself. Each class must be edited for its respective sub-commission, and then it must be laid before the general Commission, and each sub-commission convince the whole body of the correctness of its own conclusions —a pretty difficult task, gentlemen. It is now at work trying to formulate some general measure relating to convict labor and the regulaion of it in the different states, to overcome the diffi-

culties presented by the Constitution itself, matters with which you are very familiar. And it may be able on this point to find some practical measure which will relieve the public mind of whatever prejudice may exist—and it is in places very great—against the employment of convicts in industrial affairs, without destroying the morals of the prisoners, which depends very largely upon their employment in some useful work. Here is a prolific field for the Commission, in which it is probably more likely to meet with success than in any other, with perhaps one exception, and that relates to the sweating system. The sweating system is not universal in this country, but it is found in some cities in a very aggravated degree, and the Commission is collecting the information relating to the experience of the different states, taking up the excellent work of the States of New York, Massachusetts, and other States in trying to prevent the evils of the sweating system, and it may be able to formulate some practical bill which will be adopted. It can also take up the matter of the employment bureau, which is of very great importance in arresting some of the evils which we have seen growing up. Its most stupendous work, perhaps, relates to trusts, and the Commission has embarked upon a voyage of discovery in this respect; but whether it will discover anything or not remains to be seen. It has set sail, however, and it has selected as its mediating agent Professor J. W. Jenks, of Cornell University, a gentleman thoroughly acquainted with the whole question of trusts. It did start out with a project which probably would have resulted in the disruption of the Commission itself. The Commission has seen a great light in this direction, and is now confining its work to the collection of facts, and the collection of facts should be preliminary to any important reform work, no matter what direction that work may take. The Commission now understands this feature. But here is the point to which I referred yesterday: What can these bureaus do, without perhaps any intention of doing it, to assist this Commission, or if not the Commission itself, to assist somebody in solving some of the difficulties—not all of them—which surround the trust question? You can do this: One of the most important elements of fact upon which the Commission, or anybody else, must work in formulating legislation relative to the trust question lies in the conditions of each

industry prior to the organization of the trust and subsequent thereto; whether the trusts have had any effect upon the stability of labor or the rates of wages or the prices of commodities. Nobody cares much about the trusts. The people care nothing about them, unless the trusts in their methods of operation injuriously affect them. Now, are prices reduced or raised? Are wages increased or lowered? Is there a greater employment of labor or a less? These are simple facts which can be determined only by investigation of the conditions surrounding each industry comprehended by that trust prior to the organization thereof and the condition since its organization. Are there more people employed in the iron and steel business now, as compared with the number before the trust? Are the wages paid greater or less? Are the prices of commodities affected? These are the vital matters which affect the people at large. They are not interested particularly in the regulation of trusts; that is a governmental affair. But when the organization of great industries under a trust form affects the individual consumer, then it becomes something of interest to him.

The Industrial Commission must depend for these facts upon the reports which you have made in the past and those which will be made in the future relative to the conditions of the very industries themselves that are concerned in a trust organization. They may find some method, under the provisions of the Constitution relating to commerce among the States, whereby they can bring these trusts into the same position that the Interstate Commerce Commission has brought the railroads with respect to the uniformity of rates. The reports will place the responsibility somewhere, so that the people at large may know the facts which surround these organizations. This is the governmental side of it, as compared to that of the consumer. So that the Commission, if it is wise, may be able to formulate some line of legislation which will assist, first in understanding what the trust is really doing, and, secondly, if it knows how, to regulate it.

There are various other features which the Commission will take up, of course; but, to my mind, the two most valuable results which can possibly grow out of the work of the Commission relate first to the psychological value of the statistical matter. We, gentlemen, deal with the facts. We are not much

in the habit of considering the forces which make the facts. We are not much concerned with the mental attitude which lies underneath the facts which we collect. It is a difficult thing to apply a statistical method to motives. We can apply the statistical method to the results of motive, to the acts of men, to business transactions, and all that class of information; but when we undertake to apply it psychologically to the motive side which leads to statistical development, we find the method either fails or is so difficult to apply that we are obliged to let it alone. The Industrial Commission has a broader field than that given to us. The Commission does not undertake, as I have intimated, to cover work we are covering. It is in no sense antagonistic to our work. It is supplemental to it. Its duty is to look beneath the great body of facts which come to it and ascertain, if possible, the social, the economical, the industrial conditions that lead to the facts which were reported to it. We do it occasionally. We do it when called upon. We would be glad to do it more. But we are not organized for the purpose of philosophical discussion. The Commission is organized as much for that as anything else.

So there must be a value in the work of this Commission. But, second, the greatest work of all, or the greatest value coming from it, must be considered as negative. When people who have solutions to recommend, legislation to urge which they think will straighten out all the incongruities of society and bring happiness to mankind, they may find, after two or three years of studious investigation by this Commission, and with an opportunity to each man of presenting his solution or his panacea for the ills which beset us, that they cannot be carried into execution. The clearing of the air by the statistics of the Commission, if honestly collected and impartially given to the public, will be its greatest, but its negative value, or the negative value of its work. I believe the members thoroughly understand this, and that each and every man is honestly endeavoring to find some way by which the Commission can be of the greatest possible value to the community at large. It will fail here and there. It will fail generally, gentlemen. But if it succeed in any one thing, if it succeed in allaying the suspicious attitude which exists between the wage receivers on the one hand and the wage payers on the other, the value of its work cannot be estimated in dollars and cents. We

all know that the chief cause of the difficulties which come between the employer and the employee is that of suspicion. Each suspects the other of some motive reaching to some action which will be detrimental to its own interest. The work of the Commission can do much to remove this suspicious attitude, or rather to modify it, if not more than that. And if it can convince both employer and employee that each has a perfect right to know the conditions of the industry in which they are interested, that the man who receives two dollars a day has just as good a right to want two dollars and a half a day as the man who is getting fifty thousand dollars income has a right to want seventy-five thousand—if you can once get that principle instilled into the minds of employers and employees, you will reduce the number of strikes and increase the prosperity of all concerned. That is the fair, honest, business attitude which many manufacturers and many workingmen are taking at the present time, and if the considerations of the Commission can bring this feature to the attention of the people, not through legislation perhaps, but through information, it will have accomplished a great work and be worth far more than it has cost.

We know how strikes originate. Some of you have read "David Harum." Old David said, you know, that the golden rule of the horse trader is to do unto the other fellow as you think he is going to do unto you, and do it first. Many strikes are the result of the practical application of that rule. Lockouts are often ordered to get ahead of the striker. Strikes are often ordered to get ahead of the lockout. Each tries to see what the other fellow is going to do and do it first.

That is the suspicious attitude to which I have referred, and the considerations and the recommendations and the work of the Commission can do much toward enlightening the public relative to solutions and the practical application of those principles which avoid legislation in the solving of industrial and social problems. I believe in the Commission, although I am satisfied, as I have said, that it will fail in many directions. If it succeeds in one or more, we can be grateful for its existence.

CURRENT WORK.

Among the reports on current work, Mr. Wadlin of Massachusetts, said: Mr. President, the current work of the Massachusetts bureau includes, first, a report on Sunday labor, which will cover thoroughly the present conditions as to labor performed on the Sabbath, the number of persons employed, reasons for their employment, whether or not such employment can be further restricted, etc. This investigation was undertaken by authority of the legislature, upon a petition presented by persons interested in the movement to secure to workingmen one day's rest in seven. The problems more or less connected with Sunday labor, under the changed and still rapidly changing conditions of modern life, are from time to time brought to the attention of legislative bodies under propositions for new legislation. In Massachusetts it was felt that antecedent to any such legislation the exact facts relating to the subject, in its broadest aspect, should be known. The purpose of this report is the presentation of these facts.

The bureau is also completing for immediate publication the final section of the presentation relating to graded weekly wages in Massachusetts, other states, and foreign countries, which was begun in the annual report for 1895. This final section will cover occupations the initial letters of whose names are subsequent to *O* in alphabetical arrangement.

The regular work of the bureau, including what is termed in our reports labor and industrial chronology—a concise record of leading events during the year in the industrial affairs of the state, and also the work relating to the annual statistics of manufactures, is, of course, continued. With this you are familiar, as it has formed a regular part of our operations from year to year. We shall this year adopt a new arrangement in reporting the details included under the head of labor chronology, classifying and analyzing the results so as to improve the form of presentation. In the report on the annual statistics of manufactures the textile industry will receive special treatment, historical and statistical, so as to bring together, in monograph form, information relating to this important industry from the earliest years down to the present. The same plan will be followed in subse-

quent years, taking up the leading industries of the state, seriatim.

The work of the decennial census of Massachusetts is practically completed. This, as you know, is conducted by the bureau. The printing of the final volumes will proceed as fast as possible. These will contain important details relating to the occupations of the people, and especially as to the question of employment and unemployment, bringing out under the last named head much new matter, not only as to the amount of enforced idleness in the different industries, but with reference to irregularity and diversity of occupation, due to the lack of continuity in employment through the year.

In addition to the work I have summarized, the bureau publishes a quarterly bulletin, containing periodical reviews of employment and earnings and other articles upon special subjects relating to labor and industrial conditions.

The bureau is also preparing a special report upon that form of profit sharing between employers and employees which results in annuity funds, sick and disability benefit funds, etc.; that is to say, funds which are partly in the nature of insurance and partly profit sharing, supported in whole or in part by the mutual contributions of employers and their employees. The material for this report is largely from original data collected abroad, where the establishment of such funds is well known.

Mr. Clark of Pennsylvania, said:

Mr. President, our report for 1898 covers as a census work not only Pennsylvania's great industries, pig iron, crude steel, iron and steel rolled into finished form and tin plate, but the production of limestone for manufacturing purposes and silk manufacture.

Let me give you some idea of our great iron and steel industry. In 1898 we produced of pig iron alone some five and one-half million gross tons, or over 47 per cent. of the entire production of the United States. We produced 5,275,984 gross tons of bessemer, open hearth and crucible steel, or over 59 per cent. of the entire production of the United States. We produced of iron and steel rolled into finished form, that is, bars, shapes, rolled axles, sheets and plates, cut nails, spikes and rails, 5,537,249 net tons, or about 55 per cent. of the entire production

of the United States. This statement excludes steel billets and puddle bar, as we do not count them as a finished product.

Not only does Pennsylvania lead all other States in the Union in the production of iron and steel, but she is a distinguished leader in the production of tin plate. We produced last year 344,064,000 pounds of black plate for tinning as against 104,757,360 pounds in 1895, showing an increase of 228 per cent. over 1895. We turned out a tinned product of 262,934,000 pounds last year as against 104,375,635 pounds in 1895, or an increase of 152 per cent. We made 44 per cent. of all the black plate for tinning of the entire production of the United States, and turned out 36 per cent. of the tinned production of the United States. We had 18 black plate works in operation and 7 dipping plants. For 1899 our relative production will be materially increased as the enormous plant at New Castle, with which many of you are, perhaps, familiar, with a capacity of 250 tons daily, was but started at the beginning of this year.

I have given you, gentlemen, somewhat of the details of our iron and steel business and of our tin plate production because of the attention that has been drawn to the iron industry during the past few months by reason of the rapid advance in values and the almost phenomenal demand for consumption. Perhaps you will better understand the remarkable growth of the tin plate industry in the United States if I tell you that in 1892 the entire production of black plate for tinning was but 40,478,816 pounds, while in 1898 the entire production was 782,414,080 pounds, an increase of 1833 per cent. In making our enormous production of pig iron there was used approximately 2,700,000 tons of limestone that was produced in our own State, with a margin left to help our neighbors. And when I tell you that we produced 111,392,809 tons of coal and 10,171,920 tons of coke, you will know that we did not have to go outside of our State for fuel. You will better understand the force of this statement when you recall that Pennsylvania produced the two-thirds of all the coal produced in the United States.

But Pennsylvania does more than furnish the black diamonds for the United States, and make the iron and steel and the tin plate, she is a large textile manufacturer. She is becoming a large manufacturer of silk. In this industry, her product was

valued in 1898 at $32,334,620 as against $24,184,583 in 1895, when her last census was taken. We had 88 establishments in operation as against 65 in 1895. We had 699,308 spindles of all kinds as against 557,492 in 1895 or an increase of 25.4 per cent. We had 9,238 power looms of all kinds as against 5,692 in 1895, an increase of 62.2 per cent. We had 3,401 machines of all kinds as against 2,280 in 1895, an increase of 49.2 per cent. The most remarkable increase in production was in that of ribbons, the increase being double, or from 35,000,000, in round numbers, in 1895 to 70,000,000, in round numbers, in 1898. In giving you a brief synopsis of our forthcoming report, which is now in the hands of the printer, we have so far touched upon the production of the United States as to lead us to ask the question, What can she not do, if she has Pennsylvania to help her?

Mr. Matthews of Maine said:

Mr. President and Gentlemen: My report on the current work of our bureau will necessarily be brief, from the fact that our report is issued at the close of each calendar year, and has not yet been entirely formulated. At the present time we are making investigations of the manufactures on the same lines as last year. Investigations are also in progress, through special agents, of the lumber industry, and of the pulp and paper industries of the State. The forestry of Maine is one of its most valuable inheritances. We have, in round numbers, 13,500,000 acres of timber land. The primeval woods of Maine accordingly, will cover an extent seven times larger than that of the famous Black Forests of Germany, at its largest expanse in modern times. The States of Rhode Island, Connecticut, and Delaware could be lost together in our northern forests of Maine and still have about each a margin of wilderness sufficiently wide to make its exploration without a compass a work of desperate adventure to an inexperienced woodsman. The various branches of industry growing out of the lumber business of the State, furnish employment to at least 30,000 men. With the limited means at my disposal, the investigation of this immense interest can be only tentative, but it is hoped that many valuable facts may be obtained. The growth and development of the pulp and paper business during the past few years, has been phenomenal. A great number of new plants have been erected,

and the expenditures made involve many millions of dollars. In 1895 about $13,000,000 were invested in pulp and paper manufacturing in Maine, and employment given directly to upward of 5,000 men in these twin industries. Indirectly, a much larger number is kept busy, when one considers the cutting of the trees in the forest, the driving of the logs down the rivers to the pulp mills, and the various processes undergone. The best wood for pulp is spruce, and, while northern Maine abounds with this article, the question naturally arises, will the supply long hold out to meet the rapidly growing demands made upon it? Mills are constantly being erected, and it is expected that our investigations will show an immense increase in the pulp and paper business since our last investigation in 1895. These investigations constitute the more important current work of our bureau. I am happy to be able to state that the relations between capital and labor are generally amicable, and that labor troubles have thus far, during the present year, been limited to two or three places in the State, and have been of short duration. Labor is generally employed at fair wages, and the outlook for general business is very favorable. Maine's immense resources are coming to be known and appreciated, and it is not a too optimistic view which we take, when we predict a bright future for our glorious State. Allow me here, gentlemen, to express my appreciation of the honor done us by your brief visit to Maine, and my regret that you are not able to spend more time within our borders, as I am convinced, from the favorable opinions you have already expressed, that a fuller observation of our resources of sea and shore, of mountains, woods, lakes, and rivers, would impress you with the fact that Maine is a good State to live in as well as to be born in.

RESOLUTIONS.

Mr. Conner, from the Committee on Resolutions, made the following report:

WHEREAS, The fifteenth annual convention of the Association has been a most gratifying one in many ways, and especially so in the facilities provided for its public sessions, and in the opportunities afforded for personal conference and interchange of views of its members in respect to the work in which they are engaged; therefore—

Resolved, That the thanks of the convention are due to the Hon. Samuel W. Matthews and Major C. J. House for the excellent arrangements in providing for the meetings of the Association, for their generous hospitality, and for the interesting and instructive provisions for the comfort and entertainment of the members.

2. That our thanks are specially due to Governor Powers, of Maine, and to Mayor Lane, of Augusta, for their official and personal welcome to this State and city and the many courtesies shown us during our sojourn here, and to the press, not only of Portland and Augusta, but of the whole State, for the courtesies extended to this Association.

3. That our thanks are due to Hon. C. E. Atwood on the occasion of our visit at Old Orchard, and to Mr. M. N. Rich, of the Portland Board of Trade, and Mr. W. C. T. Goding, of the Casco Bay Steamer Company, for courtesies shown us during our stay in Portland.

4. That Professor A. E. Rogers, Professor of Law in the University of Maine, deserves the thanks of the Association for his able address on the "Relation of Public and Private Corporations to the Public."

5. That our thanks are due and are hereby tendered to Hon. L. G. Powers for his able and instructive address on the work of the twelfth census; and also to General James Latta for his able and interesting address on "Economics in the Philippines."

6. That we tender our very sincere thanks to the Hon. Carroll D. Wright, the President of this Association, for his courtesies in presiding over the deliberations of the convention, his intelligent and thoughtful direction of its proceedings, and for the able address delivered during its closing session.

7. That we extend our most hearty congratulations to Hon. James W. Bradbury, of Augusta, an ex-United States Senator, of Maine, now in his 97th year, and thank him for the bright words of encouragement respecting our work in the brief address delivered before our convention.

8. That the thanks of this Association are specially due to Colonel Samuel B. Horne for his most efficient services as Secretary of this Association; for much of the interest and success of our convention, as well as the social pleasure, we feel

are due to Colonel Horne, who has served us so long and well.

9. That we tender our thanks to Dr. and Mrs. J. F. Hill for their kind hospitality extended to this Association.

SOCIAL EVENTS.

May 11th, by previous arrangement made by Commissioner Matthews, of Maine, the delegates met at Old Orchard, one of Maine's famous seaside summer resorts, where a very pleasant half-day was spent in viewing the magnificent ocean scenery, and a delightful ride on the Orchard Beach Branch railway was taken. Governor Powers and wife, who were visiting at Old Orchard, accompanied them on this ride.

At 4:30 P. M. the party took train for Portland, where they arrived at 5:30, and were met at the station by Hon. M. N. Rich, Secretary of the Portland Board of Trade, to whom they are much indebted for courtesies extended them while in Portland. On arrival at the Falmouth Hotel, the headquarters of the party while in Portland, they were met by C. W. T. Goding, agent of the Casco Bay Steamboat Company, who presented them with tickets for an evening excursion to Peaks Island and the theatre upon that island, which was much enjoyed.

May 12th, on invitation of Mr. Goding, a steamboat excursion down the bay to Long Island was taken in the forenoon, affording a view of the magnificent ocean and island scenery of Casco Bay.

The kindness and attentions extended to the party while in Portland, particularly by Hon. M. N. Rich, C. W. T. Goding, Esq., and Landlord F. H. Nunns, were thoroughly appreciated and acknowledged by all. At 5:30 the party left Portland for Augusta, where they arrived at 7:20, and were taken in carriages to the Augusta House, their headquarters. In the evening, on invitation of Commissioner Matthews, the party attended a church wedding, that of his daughter. Among the presents made to the bride was an elegant silver water pitcher and salver, presented and inscribed, "By the Commissioners of Labor Bureaus of the United States."

July 13th, in the afternoon, a carriage ride, tendered and accompanied by the Governor and Council, and by other prominent State officials, was taken to the Soldiers' Home at Togus,

where the party were cordiallv received and entertained by Col. S. H. Allen, Governor of the Home, and where a few hours were pleasantlv spent in inspecting the grounds and buildings of that beneficent institution.

In the evening the party attended a banquet given by Dr. John F. Hill, member of the Governor's Council, and wife, at their beautiful residence, the former home of James G. Blaine. The occasion was a notable one, and the associations connected with the place made it one long to be remembered.

REPORT

OF THE

Inspector of Factories, Workshops, Mines and Quarries.

STATE OF MAINE.

OFFICE OF INSPECTOR OF FACTORIES,
WORKSHOPS, MINES AND QUARRIES,
BIDDEFORD, December 1, 1899.

To Hon. Samuel W. Matthews, Commissioner of Industrial and Labor Statistics:

In compliance with the requirements of an act of the legislature, approved March 29, 1893, directing the Inspector of Factories, Workshops, Mines and Quarries to make a report to the Commissioner of Industrial and Labor Statistics on or before December first annually, I have the honor to herewith submit my third annual report.

Very respectfully,

CHARLES E. ATWOOD,

Inspector.

REPORT.

The duties imposed by law upon the Inspector of Factories, Workshops, Mines and Quarries, are, as the title indicates, multifarious and to some extent, exacting; but the performance of these duties provides an excellent school of instruction in which the problems are not always easy of solution.

The labor problem in all its phases, and particularly in that phase which deals with the relations between the employer and the employee, is one with which this office is brought face to face. Never before has there been, among our citizens, such a widespread interest in this question, nor such an earnest, sincere endeavor to learn all the facts bearing on it, and the best methods to be used in dealing with the evils which those facts reveal.

It is an undeniable fact, that a nation's commercial prosperity, as well as its intellectual supremacy, depends almost entirely upon the good health, proper education and contentment of that great mass of population who earn their living by their own manual labor. This axiom, for it is a self-evident truth, forces upon us the conclusion that it is a patriotic duty, as well as a commercial expediency, to inform ourselves of the wise laws which have been enacted for the improvement of existing conditions in our factories, workshops, mines and quarries, and also to give to the enforcement of these laws our active as well as our moral support.

During the past year, our State has been free from strikes of any magnitude, and the few disagreements which have occurred between corporations and their employees, have been settled without the compelling influence of a long strike, by making use of that more rational method, arbitration. Herein can be seen a significant indication of the growing belief, that reason,

and not brute force, should control the negotiations between employers and the employed.

In our cotton manufacturing cities we are sharing in the general revival of this industry, and the market conditions are such, that recent reductions in the price of labor have been restored, a further increase in the pay is being discussed, and the mills are using all the help which their space will allow. This is an encouraging condition, and is of especial importance to the entire population of those cities where the mills are located. In many such cities the cotton factory is the only large plant where labor is employed, and the material prosperity of that city depends to a great degree upon the profitable and continuous working of the cotton factory.

In my official visits, during the past year, to the agents, managers and superintendents of the many manufacturing establishments of our State, I have been treated with the greatest consideration, every facility has been given me for the most careful inspection of the factory and help, and I am pleased to note many improvements in the sanitary conditions and in the means taken to prevent loss of life by fire; but there is yet much to be desired in these very important particulars, especially in the smaller shops and factories.

In buildings used for the employment of labor, where I have discovered palpable cases of violation of the laws regarding sanitation and the swinging outward of doors of egress, my suggestions have been accepted with promises of the amendment of such violations, and the promises have generally been fulfilled.

Fortnightly payments have been so widely adopted, in accordance with the law, that the benefits arising therefrom are known to everyone who lives in a so-called factory town or city. Under the present system, the wage earner is better able to make his purchases for cash, and can more easily arrange his necessary expenses within the limits of his income. No law of recent enactment has done more for the material prosperity and the mental independence of the employees in our State, than this same law providing for fortnightly payments. The merchants of our cities realize this fact, and their books do not now show the long unsettled accounts which formerly adorned their pages.

The employment of children in factories and workshops, is a matter which is difficult to handle in such a manner as I would like. That the law for the regulation of such employment is violated, I am well satisfied, but to secure convicting evidence of such violation is, I have found, a difficult task.

The management of corporations employing large numbers of children, have generally instructed their overseers, who hire the help, to conform strictly to the letter of the law, and that this has been done is evidenced by the fact that, in every room where children are employed, is a certificate for each child, certifying that the law has been complied with, in his or her case. I am reasonably sure, that in many cases, the statements made by parents or guardians, as to the age and attendance at school of their children, are false, and that the children are instructed to make false statements if questioned regarding the facts.

The ignorance, and often what is worse, the greed of parents or guardians, is a constant hindrance to the officers who try to perform their duties. This, in itself, is a powerful argument in favor of compulsory education. The elevation of thought and ambition which is a sure result of education, would greatly assist in satisfactorily solving this problem.

Until we can succeed in creating among those who profit by this violation of the law, a proper appreciation of the laws which were so wisely enacted, and a realizing sense of the lasting injury which their cupidity is inflicting upon those who should receive only blessings at their hands, we shall always be hampered in our work along this line. How best to get at the root of this difficulty, and apply the remedy, is one of the problems of my office. I believe that the hearty co-operation of the educational department of our State government, acting through the truant officers in the several cities and towns, would be of invaluable assistance to this department, in the proper enforcement of the laws regulating child labor.

The following extracts from the School Laws of Maine, under the head of Compulsory Education, will make plain the reason why we desire all the assistance, and information which school officials, and especially truant officers, can furnish us.

"Every child between the ages of seven and fifteen inclusive shall attend some public day school during the time such school

is in session; provided that necessary absence may be excused by the superintending school committee or superintendent of schools or teacher acting by direction of either; provided, also, that such attendance shall not be required if the child obtain equivalent instruction for a like period of time, in an approved private school or in any other manner approved by the superintending school committee; and provided further, that the superintending school committee may exclude from the public schools any child whose physical or mental condition makes it inexpedient for him to attend. All persons having children under their control shall cause them to attend school as provided in this section, and for every neglect of such duty shall forfeit a sum not exceeding twenty-five dollars, to the treasurer of the city or town, for the use of the public schools of such city or town, or shall be imprisoned not exceeding thirty days.

* * * * * * *

"Cities and towns shall annually elect one or more persons, to be designated truant officers, who shall inquire into all causes of neglect of the duties prescribed in section one and ascertain the reasons therefor, and shall promptly report the same to the superintending school committee, and such truant officers, or any of them shall, when so directed by the school committee or superintendent in writing, prosecute in the name of the city or town, any person liable to the penalty provided in said section; and said officers shall have power, and it shall be their duty, when notified by any teacher that any pupil is irregular in attendance to arrest and take such pupil to school when found truant; and further, it shall be the duty of such officers to enforce the provisions of sections one hundred and fourteen to one hundred and sixteen, inclusive, of chapter eleven of the revised statutes. Every city or town neglecting to elect truant officers, and truant officers neglecting to prosecute when directed, as required by law, shall forfeit not less than ten nor more than fifty dollars, to the use of the public schools in the city or town where such truant officer resides.

* * * * * * *

"If a child, without sufficient excuse, shall be absent from school six or more times during any term, he shall be deemed an habitual truant, and the superintending school committee shall notify him and any person under whose control he may be that

unless he conforms to section one of this act, the provisions of the two following sections will be enforced against them; and if thereafter such child continues irregular in attendance, the truant officers or any of them shall, when so directed by the school committee or superintendent in writing, enforce said provisions by complaint. Any person having control of a child who is an habitual truant, as defined in the foregoing section, and being in any way responsible for such truancy, and any person who induces a child to absent himself from school, or harbors or conceals such child when he is absent, shall forfeit not exceeding twenty dollars, for the use of the public schools of the city or town in which such child resides, to be recovered by the truant officer on complaint, or shall be imprisoned not exceeding thirty days."

It will be readily seen, that the powers conferred by this law, together with the school census, give such officers unusual opportunities for gathering accurate information as to the age and attendance at school of all children within their jurisdiction.

The so-called "Ten hour law" is so simple in its wording and so easy of comprehension, that very little difficulty has been met with, in securing its enforcement. In these times of great revival in manufacturing industries, however, there is a strong temptation for such manufacturers as are rushed with orders, to exceed their legal rights in working an extra number of hours per week, for a limited time, but with the exception of one unsigned communication, no complaint about the matter has been made to me during the year.

The tendency, now very apparent in our State as well as in many other states in our country, toward a better understanding between employee and employer, is one of the encouraging signs of the times. The idea has been accepted, and belief in it is daily growing, that whatever makes for the prosperity of the proprietor, is sure to be of material benefit to the people in his employ, in other words, that their interests are identical. The idea is not a mere sentiment, but good practical common sense, and the experience of our best and most successful capitalists, as well as that of our most intelligent workingmen has demonstrated the truth of the statement.

Very few complaints have been made to me, during the past year, of violations of the law requiring fortnightly payments of

wages, and these few violations, I found upon investigation, to be the result of neglect or misunderstandings, rather than of willful wrongdoing.

SCHEDULE OF THE COTTON AND WORSTED MANUFACTORIES OF THE STATE.

Showing the comparative number of children employed in 1898 and 1899.

The total number is slightly in excess of that of last year, but this is accounted for by the fact that the corporations have largely increased their production, in these times of general prosperity, and the percentage of increase in the number of children employed is much smaller than that of the increase of adults employed. The Sanford mills were not included in 1898.

Name of Corporations.	Location.	Children Employed.					
		1898.			1899.		
		Under 16 years.	Between 15 and 16 years.	Under 15 years.	Under 16 years.	Between 15 and 16 years.	Under 15 years.
Androscoggin Mills	Lewiston...	25	23	2	56	29	27
Avon Manufacturing Company.	Lewiston...	-	-	-	-	-	-
Bates Manufacturing Company.	Lewiston...	25	23	2	36	30	6
Continental Mills	Lewiston...	7	7	-	65	49	16
Hill Manufacturing Company...	Lewiston...	10	9	1	26	16	10
Barker Mill	Auburn....	14	9	5	7	5	2
Cabot Manufacturing Company.	Brunswick .	56	35	21	82	20	62
Lockwood Company	Waterville .	153	105	48	171	120	51
Edwards Manufacturing Co	Augusta	99	81	18	95	60	35
Farwell Mills	Lisbon.....	31	20	11	30	20	10
Pepperell Manf. Co., Laconia Div.	Biddeford...	102	60	42	92	70	22
Pepperell Manf. Co., Pepp. Div..	Biddeford...	127	81	46	89	68	21
York Manufacturing Company..	Saco	42	38	4	40	30	10
Goodall Worsted Company	Sanford.....	89	57	32	45	23	22
Sanford Mills	Sanford.....	-	-	-	88	33	55
Total	.....	780	548	232	922	573	349

INDEX.

	PAGE
Letter of transmittal	3
Introduction	5
The cotton industry	7
The woolen industry	11
The boot and shoe industry	14
Factories, mills and shops built during 1899	16
Totals for nine years	20
The slate industry	21
The lime industry	25
The pulp and paper industry	32
pulp and chemical fiber mills	33
paper mills	38
summary	45
chemical fiber or pulp	47
forest area of Maine	50
amount of lumber used	52
varying methods of cutting lumber	54
how fast does spruce grow	56
what is the amount of available spruce today	58
forestry methods adopted	60
conclusion	61
The lumber industry	64
Maine lumber cut since 1832, table	67
cutting and hauling	68
driving	72
manufacture	75
mill of the Ashland Manufacturing Company	77
Stearns' mill, East Hampden	79
Wm. Engel and Company's mill at Orono	80
mill of the Berlin Mills Company at Farmingdale	82
mill of the M. G. Shaw Lumber Company at Bath	83
logging statistics	83
conclusions	85
The Sanford plush and worsted industries	87
The Whitman agricultural works	93
Railroads	97
National convention of labor bureaus, extracts from proceedings	102
address of welcome by Governor Powers	104
by Mayor Lane	106
response by President Wright	107
address of Prof. Rogers of Orono	110
discussion on same	122
remarks of Hon. James W. Bradbury of Augusta	130

	PAGE
National convention of labor bureaus:	
address of Mr. Powers of Minnesota	130
of Gen. Latta of Pennsylvania	138
of Col. Wright	153
current work, Massachusetts	162
Pennsylvania	163
Maine	165
resolutions	166
social events	168
Errata	183
Report of Inspector of Factories, Workshops, Mines and Quarres	171
Letter of transmittal	173
Report	175
Children employed in cotton and worsted mills	180

ERRATA.

Page 26, nineteenth line from top, for "county," read "country."

Page 40, fourth and fifth lines from top, for "Hollingsworth & Whitney," read "S. D. Warren & Company."

Page 67, in place of last line of table and foot note, read figures for the entire season as follows: "1899; pine, 23,246,498; spruce, 133,234,823; hemlock, etc., 25,001,268; total, 181,482,589."